

DEPARTMENT OF TRANSPORTATION STATE OF GEORGIA

OFFICE OF DESIGN POLICY & SUPPORT INTERDEPARTMENTAL CORRESPONDENCE

FILE P.I. # 0009400 **OFFICE** Design Policy & Support
CSSTP000900400
DeKalb County
GDOT District 7 - Metro Atlanta **DATE** 04/15/2015
SR13 from Afton Lane to Shallowford Terrace -
Phase II

FROM  for Brent Story, State Design Policy Engineer

TO SEE DISTRIBUTION

SUBJECT APPROVED CONCEPT REPORT

Attached is the approved Concept Report for the above subject project.

Attachment

DISTRIBUTION:

Hiral Patel, Director of Engineering
Joe Carpenter, Director of P3/Program Delivery
Genetha Rice-Singleton, Assistant Director of P3/Program Delivery
Albert Shelby, State Program Delivery Engineer
Darryl VanMeter, State Innovative Delivery Engineer
Bobby Hilliard, Program Control Administrator
Cindy VanDyke, State Transportation Planning Administrator
Eric Duff, State Environmental Administrator
Bill DuVall, State Bridge Engineer
Andrew Heath, State Traffic Engineer
Angela Robinson, Financial Management Administrator
Lisa Myers, State Project Review Engineer
Charles "Chuck" Hasty, State Materials Engineer
Lee Upkins, State Utilities Engineer
Paul Tanner, State Transportation Data Administrator
Attn: Systems & Classification Branch
Richard Cobb, Statewide Location Bureau Chief
Ed David Adams, State Safety Program Manager
Kathy Zahul, District Engineer
Scott Lee, District Preconstruction Engineer
Nicholas Fields, District Utilities Engineer
Xavier James, Project Manager
BOARD MEMBER - 5th & 6th Congressional Districts

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA
PROJECT CONCEPT REPORT**

Project Type: Safety
GDOT District: 7
Federal Route Number: 23

P.I. Number: 0009400
County: DeKalb
State Route Number: 13

Project Description

This project is located on SR 13 from Afton Lane to Shallowford Terrace and includes upgrading existing or adding new sidewalk to meet ADA standards, adding a raised median in the existing two way left turn lane from Afton Ln to Clairmont Terr and adding pedestrian lighting. In addition, multiple pedestrian hybrid beacons are proposed along with mid-block pedestrian refuge/crossing islands.

Submitted for approval:

(Nicole Reutlinger) 1/18/16
Atkins Date

Albert V. Shelby III 1/25/16
State Program Delivery Engineer Date

James 1/19/16
GDOT Project Manager Date

Recommendation for approval:

Eric Duff * 02/05/2016
State Environmental Administrator Date

State Traffic Engineer Date

Lisa Myers * 02/04/2016

Project Review Engineer Date

Lee Upkins * 02/02/2016

State Utilities Engineer Date

District Engineer Date

Bill DuVall * 02/16/2016

State Bridge Engineer Date

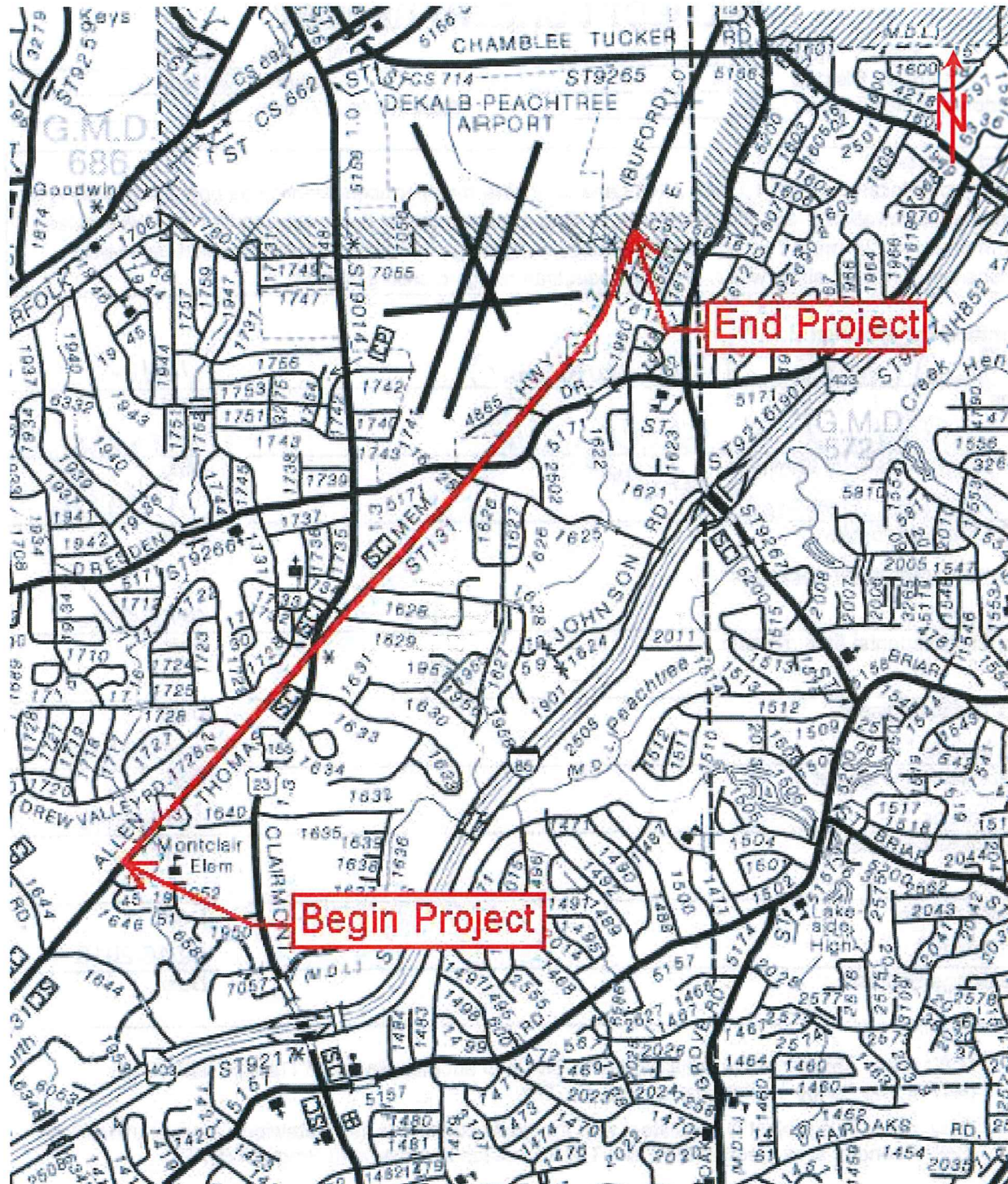
- ☒ MPO Area: This project is consistent with the MPO adopted Regional Transportation Plan (RTP)/Long Range Transportation Plan (LRTP).
- ☐ Rural Area: This project is consistent with the goals outlined in the Statewide Transportation Plan (SWTP) and/or is included in the State Transportation Improvement Program (STIP).

Cynthia VanDyke * 02/03/2016
State Transportation Planning Administrator Date

* - Recommendation on file

County: DeKalb

PROJECT LOCATION MAP



County: DeKalb

PLANNING AND BACKGROUND

Project Justification Statement: The purpose of the proposed project is to reduce crash frequency and severity for the pedestrian public along SR 13/Buford Highway from 400 Feet North of Afton Lane to Shallowford Terrace in DeKalb County, GA. Crash data from 2008-2012 indicated that 82 crashes occurred along this corridor resulting in 48 injuries and 2 fatalities. The vast majority of these crashes were the result of a lack of pedestrian facilities to accommodate the conflicting movements with vehicular traffic.

In Georgia, nearly 9.4% of people killed in motor vehicle crashes were pedestrians, making pedestrian safety a focus area for the Georgia Department of Transportation. National statistics are relatively higher averaging a rate of 13%. The above mentioned project proposes to upgrade the pedestrian facilities by adding refuge islands, sidewalks, pedestrian hybrid beacons, and the addition of pedestrian lighting throughout the corridor. The pedestrian hybrid beacon and the pedestrian crossing island are two of the nine proven safety countermeasures listed by FHWA. Studies show that the implementations of these countermeasures will reduce the number of pedestrian crashes by 69% and 46% respectively. This will result in a greater reduction in crash frequency and severity.

The proposed project was initially part of PI #731770. A Revised Concept Report, approved June 1, 2009, split that project into two separate phases with termini listed below:

- Phase I: Project limits begin at Lenox Road (Fulton MP 3.38) and end at Afton Lane/Highland North Apartments (DeKalb MP 2.17)
- Phase II: Project limits begin at Afton Lane (DeKalb MP 2.17) and end at Shallowford Terrace (DeKalb MP 4.77)

At the time the new project termini and phases were implemented to ensure that the project could be constructed with existing (Phase I) and requested (Phase II) funding allotments. Phase I is currently under construction and nearing completion.

Existing conditions: SR 13/Buford Hwy is a six lane roadway that is classified as an Urban Principal Arterial roadway with 11 foot lanes. SR 13/Buford Hwy has combinations of an auxiliary left turn lane for both north and southbound traffic, a two-way/left turn lane, and also right turn lanes throughout the corridor both with 12 foot lanes. The Urban Principal Arterial runs north/south in DeKalb County. The current AADT obtained from the Georgia Department of Transportation (GDOT) traffic data application, GEOCOUNTS, for SR 13/Buford Hwy ranges from 33,900 (Afton Lane) to 18,100 (Shallowford Terrace) between mile log 2.15 to 4.78. The 2014 average 24-hr truck volume for the corridor is 4.5%. The right-of-way varies from 100 feet to 115 feet. Header curb and/or curb and gutter is in place throughout this corridor. The posted speed limit for this section of SR 13/Buford Hwy is 45 mph.

Other projects in the area:

1. DeKalb County, P.I. No. 0010884, **SR 13 from CS 434/Lenox Rd. to CR 1645/Afton Ln. – PED Upgrade**
2. DeKalb County, P.I. No. M004546, **Milling and Resurfacing of SR 155 from 0.03 mi South of SR 154 to SR 13**
3. STP00-0002-00(903), DeKalb County, P.I. No. 0002903, **Sidewalk addition on SR 155 from I-85 to SR 13 – Phase I, DK-AR-BP055A**

MPO: Atlanta Regional Commission (ARC)

Congressional District(s): 5, 6

Federal Oversight: ☐ PoDI ☒ Exempt ☐ State Funded ☐ Other

Projected Traffic: ADT 24 HR T: 4.50 %

Current Year (2014): 26,650 Open Year (2019): 29,250 Design Year (2039): 39,000

Traffic Projections Performed by: GDOT Office of Planning

County: DeKalb

Functional Classification (Mainline): Urban Principal Arterial**Complete Streets - Bicycle, Pedestrian, and/or Transit Standard Warrants:**

Warrants met: ☐ None ☒ Bicycle ☒ Pedestrian ☐ Transit
 (See attached TE Studies.) *DRP DV required to omit bicycle accommodations.*

Is this a 3R (Resurfacing, Restoration, & Rehabilitation) Project? ☒ No ☐ Yes

Pavement Evaluation and Recommendations

Initial Pavement Evaluation Summary Report Required? ☒ No ☐ Yes
 Initial Pavement Type Selection Report Required? ☒ No ☐ Yes
 Feasible Pavement Alternatives: ☒ HMA ☐ PCC ☐ HMA & PCC

DESIGN AND STRUCTURAL

Description of the proposed project: This project is located along SR 13/Buford Hwy from 400 Feet North of Afton Lane to Shallowford Terrace, approximately 2.6 miles in length. The improvements to occur along the corridor include: upgrading existing or adding new sidewalk and retrofitting the existing driveway aprons, adding a raised median from Afton Lane to Clairmont Terrace and adding pedestrian refuge islands, upgrading handicap ramps to meet ADA standards, and adding pedestrian lighting. In areas where sidewalk doesn't currently exist or is in bad condition, 5' sidewalks will be constructed. A 2' stamped concrete strip will be added between the curb and sidewalk where possible to move pedestrians further away from the traveled way. Header curb or curb and gutter will be replaced where necessary throughout the project. Existing drainage structures will be retained or raised wherever possible throughout the corridor.

Major Structures:

Structure	Existing	Proposed
ID 089-0021-0	Double 10' wide by 10' high box culvert with 6 – 11' lanes and 1 – 12' lane with 10' shoulders on both sides. Sufficiency rating: 75.90	No changes to existing roadway, but will upgrade shoulder with new curb and sidewalk
ID 089-0247-0	Double 9' wide by 7' high box culvert with 6 – 11' lanes and 1 – 12' lane with 3' shoulders on both sides. Sufficiency rating: 76.20	No changes to existing roadway, but will upgrade shoulder with new curb and sidewalk

Mainline Design Features: SR 13/Buford Highway – Urban Principal Arterial

Feature	Existing	Standard*	Proposed
Typical Section			
- Number of Lanes	6 (3 each direction)	N/A	6
- Lane Width(s)	11'	12' des.	11'
- Median Width & Type	N/A	8' – 10'	8' raised concrete
- Outside Shoulder or Border Area Width	Varies (2' – 10')	10' min. urban	10'
- Outside Shoulder Slope	Varies	2%	2%
- Inside Shoulder Width	N/A	N/A	N/A
- Sidewalks	Varies (0' – 5')	5'	5'
- Auxiliary Lanes	12'	12'	N/A
- Bike Lanes	N/A	N/A	N/A

County: DeKalb


Posted Speed	45 mph		45 mph
Design Speed	45 mph	45 mph	45 mph
Min Horizontal Curve Radius	2846'	711'	N/A
Maximum Superelevation Rate	4%	4%	N/A
Maximum Grade	6.6%	7%	N/A
Access Control	Permitted	Permitted	Permitted
Design Vehicle	WB-67	WB-67	WB-67
Pavement Type	Asphalt	Asphalt	Asphalt

*According to current GDOT design policy if applicable

Major Interchanges/Intersections: The intersections of Buford Highway with Clairmont Terrace, Clairmont Road, the driveway to Plaza Fiesta, Plaster Road, and Dresden Drive are located within the project limits and are signalized.

Lighting required: ☐ No ☒ Yes
(See attached lighting support letters.)

Off-site Detours Anticipated: ☒ No ☐ Yes ☐ Undetermined

Transportation Management Plan [TMP] Required: ☐ No ☒ Yes 
If Yes: Project classified as: ☒ Non-Significant ☐ Significant
TMP Components Anticipated: ☒ TTC ☐ TO ☐ PI

As part of the federal Work Zone Safety and Mobility Rule, **all** Federal-aid highway projects require a TMP. Projects classified as "Non-Significant" may only require a Temporary Traffic Control (TTC) plan, often covered under Special Provision 150. Projects classified as "Significant" require a complete TMP and formal TMP report which includes a TTC plan and addresses Transportation Operations (TO) and Public Information (PI) components. If needed, the formal TMP report would typically be developed during the preliminary plans phase. For more information, see GDOT Policy 5240-1.

Design Exceptions to FHWA/AASHTO controlling criteria anticipated:

FHWA/AASHTO Controlling Criteria	No	Undetermined	Yes	Appvl Date (if applicable)
1. Design Speed	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Lane Width	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Shoulder Width	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Bridge Width	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Horizontal Alignment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Superelevation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. Vertical Alignment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8. Grade	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9. Stopping Sight Distance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
10. Cross Slope	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
11. Vertical Clearance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
12. Lateral Offset to Obstruction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13. Bridge Structural Capacity	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Design Exceptions may be submitted for sub-standard vertical curve K values and Stopping Sight Distance. There are 9 vertical curves along the corridor which may not meet current AASHTO standards for 45mph located at approximate stations 138+25, 180+15, 186+75, 205+90, 220+95, 239+45, 246+90, 259+20, and 264+15. Of these only the vertical curve at Sta. 180+15, located at the

County: DeKalb

intersection of Buford Highway with Clairmont Road, is a crest curve. The other eight are sag curves, and their headlight sight distances may be less than the preferred stopping sight distance of 360 feet.

Design Variances to GDOT Standard Criteria anticipated:

GDOT Standard Criteria	Reviewing Office	No	Undetermined	Yes	Appvl Date (if applicable)
1. Access Control/Median Openings	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Intersection Sight Distance	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Intersection Skew Angle	DP&S	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4. Lateral Offset to Obstruction	DP&S	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5. Rumble Strips	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6. Safety Edge	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. Median Usage	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8. Roundabout Illumination Levels	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9. Complete Streets	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10. ADA & PROWAG	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
11. GDOT Construction Standards	DP&S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
12. GDOT Drainage Manual	DP&S	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13. GDOT Bridge & Structural Manual	Bridges	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

A Design Variance will be submitted for sub-standard intersection skew angle located at Clairmont Rd.

Upon further review design variances for lateral offset to existing Utility Poles and for exceeding

Drainage standards for maximum gutter spread may be submitted. *Also Complete Streets for bicycle accommodations. (AKP)*

VE Study anticipated: ☒ No ☐ Yes ☐ Completed – Date:

UTILITY AND PROPERTY

Temporary State Route needed: ☒ No ☐ Yes ☐ Undetermined

Railroad Involvement: There are no railroads within the project limits.

Utility Involvements:

Electric – Georgia Power Company, Georgia Power Transmission

Gas – Atlanta Gas Light

Water/Sewer – DeKalb Watershed Management

Telephone – AT&T

Cable TV – Comcast Cable

Fiber – Level-3, Zayo, Google Fiber

Other – DeKalb County Traffic, MARTA

SUE Required: ☐ No ☒ Yes ☐ Undetermined

Public Interest Determination Policy and Procedure recommended? ☒ No ☐ Yes

See Policy and Procedures Subject Nos. 6863-12 and 3E-1 for guidance.

Right-of-Way (ROW): Existing width: 100-115 ft. Proposed width: 105-135 ft.

Required Right-of-Way anticipated: ☐ None ☒ Yes ☐ Undetermined

Easements anticipated: ☐ None ☐ Temporary ☒ Permanent ☒ Utility ☐ Other

Anticipated total number of impacted parcels: 90

Displacements anticipated:

Businesses: _____

Residences: _____

Other: _____

County: DeKalb

Total Displacements: 0Location and Design approval: ☐ Not Required ☒ RequiredImpacts to USACE property anticipated? ☒ No ☐ Yes ☐ Undetermined**CONTEXT SENSITIVE SOLUTIONS**

Issues of Concern: Pedestrian safety and accessibility

Context Sensitive Solutions Proposed: Sidewalk is proposed along both sides of the roadway throughout the project and ADA ramps and crosswalks will be installed/upgraded at all intersections. Additionally, several mid-block crossings will be added along the corridor with pedestrian hybrid beacons to provide safe crossing areas.

ENVIRONMENTAL & PERMITS

Anticipated Environmental Document:

GEPA: ☐ NEPA: ☒ CE (Reevaluation) ☐ EA/FONSI ☐ EIS**MS4 Permit Compliance – Is the project located in a MS4 area?** ☐ No ☒ Yes

The proposed project must comply with the GDOT MS4 permit and provide post-construction stormwater management to meet water quality, channel protection, overbank flood protection, and extreme flood protection standards where feasible. A review of the site to determine the feasibility of providing post-construction BMPs found four areas where it may be possible to construct BMPs for post-construction stormwater management. The remainder of the project site area has limiting factors such as stream buffers, steep slopes, underground utilities, and existing storm pipe networks that will not allow for gravity drainage to proposed BMPs and make it infeasible to provide post-construction BMPs for all project outfalls. Post-Construction BMPs have been conceptually designed within the four available site areas to meet water quality requirements. It is likely not feasible to meet channel protection, overbank flood protection, and extreme flood protection requirements in these areas due to site limitations and the cost of acquiring right-of-way or displacements that would be required to provide additional storage volume to meet channel protection and flood protection requirements. Refer to the "Concept MS4 Compliance Report" included in the supporting documents for additional information.

Environmental Permits/Variances/Commitments/Coordination anticipated:

Permit/ Variance/ Commitment/ Coordination Anticipated	No	Yes	Remarks
1. U.S. Coast Guard Permit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2. Forest Service/Corps Land	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3. CWA Section 404 Permit	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4. 33 USC 408 Decision	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5. Tennessee Valley Authority Permit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6. Buffer Variance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7. Coastal Zone Management Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
8. NPDES	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
9. FEMA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
10. Cemetery Permit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
11. Other Permits	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
12. Other Commitments	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
13. Other Coordination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

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Is a PAR required? ☒ No ☐ Yes ☐ Completed – Date:**Environmental Comments and Information:****NEPA/GEPA:** CE approved May 21, 2007. Reevaluation required.**Ecology:** A resurvey of the project area is required and an Ecology Addendum will be prepared. State threatened bay star vine is known to occur within 3 miles of the project area. Suggested survey season is May - June if habitat is present.**History:** Prior surveys for the project revealed no National Register eligible properties within the project limits. An updated field survey and Historic Resource Survey Report Addendum are required.**Archeology:** No known archaeological resources are present. Prior surveys of the project corridor did not result in the identification of archaeological sites. An updated survey for areas not studied previously is required.**Air Quality:**Is the project located in a PM 2.5 Non-attainment area? ☐ No ☒ YesIs the project located in an Ozone Non-attainment area? ☐ No ☒ YesCarbon Monoxide hotspot analysis: ☐ Required ☒ Not Required ☐ TBD*If yes to either PM 2.5 or Ozone Non-attainment, provide a comparison between the proposed project concept and the conforming plan's model description. Include such features as project limits, number of through lanes, proposed open to traffic year, etc. If project is exempt from conforming plan, explain why. If the project corridor contains a traffic signal, the design year traffic volumes exceed 10,000 vpd and the level of service is D, E or F, a CO hotspot analysis is required.***Noise Effects:** A Type III Noise Screening is required.**Public Involvement:** Due to the high minority and limited English proficient population and business community, outreach will occur in the form of stakeholder interviews, public information meetings, and educational flyers. Two public meetings have been held for this project and occurred on August 20, 2006 and August 31, 2006.**Major stakeholders:** Traveling public, business owners**CONSTRUCTION****Issues potentially affecting constructability/construction schedule:** The number of utilities may lengthen construction time. High traffic volumes may require off-peak work restrictions.**Early Completion Incentives recommended for consideration:** ☒ No ☐ Yes**COORDINATION, ACTIVITIES, RESPONSIBILITIES, AND COSTS****Initial Concept Meeting:** N/A**Concept Meeting:** December 8, 2015**Other coordination to date:** See attached PIOH Synopsis.

Project Activity	Party Responsible for Performing Task(s)
Concept Development	Atkins
Design	Atkins
Right-of-Way Acquisition	GDOT
Utility Coordination (Preconstruction)	GDOT (Atkins doing SUE)
Utility Relocation (Construction)	GDOT

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Letting to Contract	GDOT
Construction Supervision	GDOT
Providing Material Pits	Contractor
Providing Detours	Contractor
Environmental Studies, Documents, & Permits	Atkins
Environmental Mitigation	GDOT
Construction Inspection & Materials Testing	GDOT

Project Cost Estimate Summary and Funding Responsibilities: *(See attached current cost estimates)*

	Breakdown of PE	ROW	Reimbursable Utility	CST*	Environmental Mitigation	Total Cost
Funded By	GDOT	GDOT	GDOT	GDOT	GDOT	
\$ Amount	\$1,543,003.61	\$4,539,000	\$300,000	\$12,613,394.78	\$23,958	\$19,019,356.39
Date of Estimate	12/30/2013	12/7/2015	11/9/2015	3/11/2016	11/5/2015	

*CST Cost includes: Construction, Engineering and Inspection, Contingencies and Liquid AC Cost Adjustment.

ALTERNATIVES DISCUSSION**Alternative selection:**

Preferred Alternative: This alternative includes sidewalk, median and mid-block crossings, pedestrian upgrades at intersections, and pedestrian lighting.

Estimated Property Impacts:	90	Estimated Total Cost:	\$19,019,356.39
Estimated ROW Cost:	\$4,539,000.00	Estimated CST Time:	18 months

Rationale: The primary purpose of this project is to improve the safety of pedestrians along this corridor. The addition of sidewalks, adding new or upgrading existing ADA ramps at intersections, providing pedestrian hybrid beacons at mid-block crossing locations, and adding pedestrian scale lighting will fulfill the need and purpose of this project.

No-Build Alternative:

Estimated Property Impacts:	0	Estimated Total Cost:	\$0.00
Estimated ROW Cost:	\$0.00	Estimated CST Time:	N/A

Rationale: This alternative would not meet the goals in the Project Justification, so was not considered a viable alternative.

LIST OF ATTACHMENTS/SUPPORTING DATA

1. Concept Layout
2. Typical sections
3. Detailed Cost Estimates:
 - a. Construction including Engineering and Inspection and Contingencies
 - b. Completed Liquid AC Cost Adjustment forms
 - c. Right-of-Way
 - d. Utilities
4. Crash summaries

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5. Traffic diagrams
6. Capacity analysis summary
7. Summary of TE Study and/or Signal Warrant Analysis
8. Lighting Support Letters
9. S I & A Reports (*Structural Inventory Reports - Culverts*)
10. Concept MS4 Compliance Report
11. PIOH Synopsis, Summary of Major Issues, and Concept Team Meeting Minutes

APPROVALS

Concur:


Director of Engineering

Approve:


Chief Engineer

4.12.16

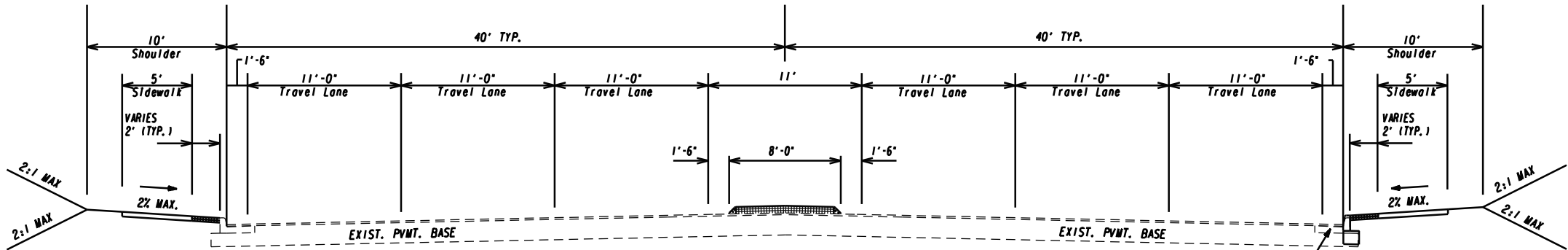
Date

ATTACHMENT 1

Concept Layout

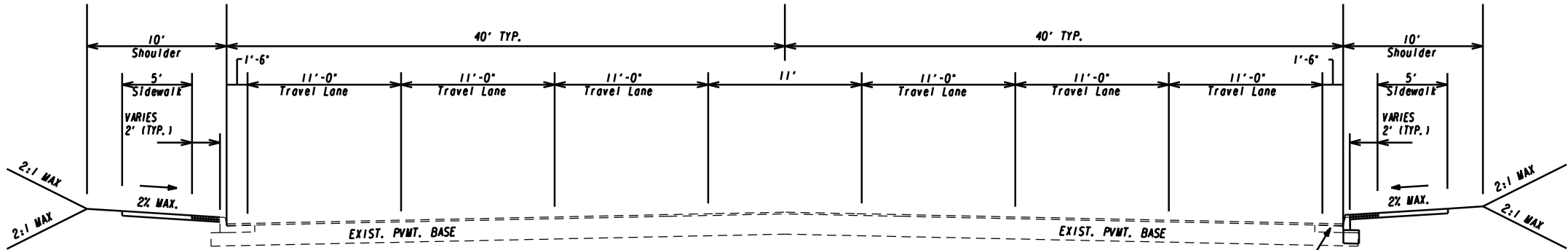
ATTACHMENT 2

Typical Sections



TYPICAL SECTION - 1

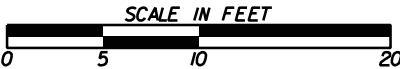
POSSIBLE EXIST.
2'-0" CONC. GUTTER PAVED OVER
TO BE REMOVED



TYPICAL SECTION - 2

POSSIBLE EXIST.
2'-0" CONC. GUTTER PAVED OVER
TO BE REMOVED

ATKINS



REVISION DATES			TYPICAL SECTIONS		
			BUFORD HWY/US 23/SR 13		
			(AFTON LN TO SHALLOWFORD TERR)		
CHECKED:		DATE:		DRAWING No.	
BACKCHECKED:		DATE:		05-001	
CORRECTED:		DATE:			
VERIFIED:		DATE:			



N. T. S.



CHECKED:		DATE:		DRAWING No. 05-002
BACKCHECKED:		DATE:		
CORRECTED:		DATE:		
VERIFIED:		DATE:		

ATTACHMENT 3

Detailed Cost Estimates

CONTINGENCY SUMMARY

A. CONSTRUCTION COST ESTIMATE:	\$ 11,104,162.63	Base Estimate From CES	
B. ENGINEERING AND INSPECTION (E & I):	\$ 555,208.13	Base Estimate (A) x	5 %
C. CONTINGENCY:	\$ 932,749.66	Base Estimate (A) + E & I (B) x	8 %
		See % Table in "Risk Based Cost Estimation" Memo	
D. TOTAL LIQUID AC ADJUSTMENT:	\$ 21,274.36	Total From Liquid AC Spreadsheet	
E. CONSTRUCTION TOTAL:	\$ 12,613,394.78	(A + B + C + D = E)	

REIMBURSABLE UTILITY COSTS

UTILITY OWNER	REIMBURSABLE COST
TOTAL	\$ -

ATTACHMENTS:

Detailed Cost Estimate Printout From TRAQS
Liquid AC Adjustment Spreadsheet

DATE : 03/11/2016
PAGE : 1

JOB ESTIMATE REPORT

JOB NUMBER : 0009400 SPEC YEAR: 13
DESCRIPTION: BUFORD HWY/SR 13 FROM AFTON LN TO SHALLOWFORD TERR - PH II

COST GROUPS FOR JOB 0009400

COST GROUP	DESCRIPTION	QUANTITY	PRICE	AMOUNT	ACTIVE?
MISC	MISCELLANEOUS (LS)	1.000	1036659.78000	1036659.78	Y
ACTIVE COST GROUP TOTAL				1036659.78	
INFLATED COST GROUP TOTAL				1036659.78	

ITEMS FOR JOB 0009400

LINE	ITEM	ALT	UNITS	DESCRIPTION	QUANTITY	PRICE	AMOUNT
0005	150-1000		LS	TRAFFIC CONTROL - PI# 0009400	1.000	1000000.00	1000000.00
0010	210-0100		LS	GRADING COMPLETE - PI# 0009400	1.000	1000000.00	1000000.00
0020	310-1101		TN	GR AGGR BASE CRS, INCL MATL	3940.000	29.34	115636.79
0025	318-3000		TN	AGGR SURF CRS	2410.000	21.35	51454.92
0030	402-3130		TN	RECYL AC 12.5MM SP,GP2,BM&HL	1010.000	94.65	95598.36
0035	402-3190		TN	RECYL AC 19 MM SP,GP 1 OR 2 ,INC BM&HL	680.000	89.32	60741.90
0040	413-1200		GL	NON-TRACKING EMULSIFIED TACK COAT	315.000	3.00	945.00
0045	441-0016		SY	DRIVEWAY CONCRETE, 6 IN TK	975.000	40.13	39134.89
0050	441-0104		SY	CONC SIDEWALK, 4 IN	17000.000	28.46	483862.50
0055	441-0108		SY	CONC SIDEWALK, 8 IN	350.000	60.20	21071.83
0065	441-0748		SY	CONC MEDIAN, 6 IN	3575.000	48.24	172463.11
0070	441-4030		SY	CONC VALLEY GUTTER, 8 IN	3500.000	47.73	167069.32
0075	441-5002		LF	CONC HEADER CURB, 6, TP 2	27340.000	10.56	288949.35
0078	441-5003		LF	CONC HEADER CURB, 8, TP 3	1000.000	15.02	15020.98
0079	441-5004		LF	CONC HEADER CURB, 10, TP 4	580.000	15.00	8700.00
0080	441-5057		LF	CONC DWL INT CURB, TP 7,DOWELS	8100.000	13.00	105300.00
0085	441-6012		LF	CONC CURB & GUTTER/ 6X24TP2	5750.000	14.50	83401.34
0090	441-6022		LF	CONC CURB & GUTTER, 6X30TP2	400.000	32.03	12812.32
0095	441-6718		LF	CONC CURB & GUTTER,6X24,TP 7	150.000	18.00	2700.00
0100	444-1000		LF	SAWED JTS IN EXIST PVMTS - PCC	500.000	4.44	2224.87
0115	500-3110		LF	CLASS A CONCRETE, TYPE P1, RETAINING WAL	860.000	461.76	397121.60
0120	500-3115		LF	CLASS A CONCRETE, TYPE P2, RETAINING WAL	460.000	617.36	283988.32
0125	500-3201		CY	CL B CONC, RET WALL	1040.000	739.38	768960.78

			0009400_CES_031116.txt			
0130	500-9999	CY	CL B CONC,BASE OR PVMT WIDEN	1020.000	213.41	217687.65
0140	515-2020	LF	GALV STEEL PIPE HDRAIL,2,ROUD	3260.000	34.42	112237.99
0145	550-1180	LF	STM DR PIPE 18,H 1-10	1750.000	45.98	80475.97
0150	550-1240	LF	STM DR PIPE 24,H 1-10	50.000	71.90	3595.48
0155	550-1300	LF	STM DR PIPE 30,H 1-10	50.000	67.97	3398.80
0160	550-1360	LF	STM DR PIPE 36,H 1-10	50.000	88.16	4408.47
0164	550-2180	LF	SIDE DR PIPE 18,H 1-10	130.000	34.38	4469.67
0165	603-2182	SY	STN DUMPED RIP RAP, TP 3, 24	100.000	49.76	4976.15

STATE HIGHWAY AGENCY

DATE : 03/11/2016

PAGE : 2

JOB ESTIMATE REPORT

0170	603-7000	SY	PLASTIC FILTER FABRIC	100.000	5.02	502.17
0173	610-6515	EA	REM HIGHWAY SIGN, STD	4.000	91.46	365.87
0174	611-3000	EA	RECONSTR CATCH BASIN, GROUP 1	21.000	2098.97	44078.45
0175	611-5360	EA	RESET HIGHWAY SIGN	4.000	124.97	499.90
0180	611-8000	EA	ADJUST CATCH BASIN TO GRADE	61.000	1770.00	107970.00
0185	611-8040	EA	ADJUST DROP INLET TO GRADE	3.000	927.42	2782.27
0190	611-8050	EA	ADJUST MANHOLE TO GRADE	3.000	1047.96	3143.91
0194	611-8140	EA	ADJUST WATER VALVE BX TO GRADE	5.000	351.98	1759.93
0195	620-0100	LF	TEMP BARRIER, METHOD NO. 1	110.000	37.16	4087.87
0199	627-1000	SF	MSE WALL FACE, 0 - 10 FT HT, WALL NO - 1	2250.000	42.64	95954.18
0200	627-1160	LF	TRAFFIC BARRIER H, WALL NO - 1	2250.000	211.79	476536.73
0205	634-1200	EA	RIGHT OF WAY MARKERS	125.000	113.00	14125.76
0210	641-1100	LF	GUARDRAIL, TP T	1175.000	42.67	50142.42
0215	641-1200	LF	GUARDRAIL, TP W	695.000	20.19	14038.50
0220	641-5001	EA	GUARDRAIL ANCHORAGE, TP 1	15.000	938.39	14076.00
0225	641-5012	EA	GUARDRAIL ANCHORAGE, TP 12	10.000	2102.63	21026.35
0229	643-1152	LF	CH LK FEN,ZC COAT, 6', 9 GA	360.000	35.00	12602.56
0230	643-8200	LF	BARRIER FENCE (ORANGE), 4 FT	1050.000	1.74	1837.30
0235	668-1100	EA	CATCH BASIN, GP 1	25.000	2458.77	61469.36
0240	668-1110	LF	CATCH BASIN, GP 1, ADDL DEPTH	15.000	219.37	3290.58
0245	668-2100	EA	DROP INLET, GP 1	3.000	1921.97	5765.91
0250	668-2110	LF	DROP INLET, GP 1, ADDL DEPTH	2.000	220.20	440.42
0255	668-4300	EA	STORM SEW MANHOLE, TP 1	2.000	2052.94	4105.89
0260	668-4311	LF	ST SEW MANHOLE,TP 1,A DEP,CL 1	2.000	247.63	495.27
0265	668-5000	EA	JUNCTION BOX	2.000	1812.31	3624.63
0275	668-7018	EA	DRAIN INLET, 18 IN	5.000	1915.00	9575.00
0280	670-4000	EA	FIRE HYDRANT	17.000	3945.16	67067.81
0284	670-9730	EA	RELOCATE X WATER METER,INC BOX	8.000	876.22	7009.78
0285	163-0232	AC	TEMPORARY GRASSING	1.500	702.34	1053.51
0290	163-0240	TN	MULCH	310.000	215.02	66656.53
0295	163-0300	EA	CONSTRUCTION EXIT	3.000	1414.94	4244.84
0300	163-0529	LF	CNST/REM TEMP SED BAR OR BLD STRW CK DM	1630.000	4.31	7032.78
0305	163-0550	EA	CONS & REM INLET SEDIMENT TRAP	123.000	128.08	15754.95
0310	165-0030	LF	MAINT OF TEMP SILT FENCE, TP C	17250.000	0.47	8234.81
0315	165-0071	LF	MAINT OF SEDIMENT BARRIER - BALED STRAW	815.000	0.45	366.77

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0320	165-0101	EA	MAINT OF CONST EXIT	6.000	659.56	3957.37
0325	165-0105	EA	MAINT OF INLET SEDIMENT TRAP	123.000	54.93	6756.82
0330	167-1000	EA	WATER QUALITY MONITORING AND SAMPLING	6.000	221.60	1329.60
0335	167-1500	MO	WATER QUALITY INSPECTIONS	18.000	399.02	7182.51
0340	171-0030	LF	TEMPORARY SILT FENCE, TYPE C	34500.000	2.91	100485.39
0345	700-6910	AC	PERMANENT GRASSING	3.000	991.68	2975.06
0350	700-7000	TN	AGRICULTURAL LIME	9.000	100.30	902.72
0355	700-8000	TN	FERTILIZER MIXED GRADE	3.000	613.00	1839.03
0360	700-8100	LB	FERTILIZER NITROGEN CONTENT	150.000	3.45	518.49
0365	700-9300	SY	SOD	14000.000	6.33	88745.86
0370	716-2000	SY	EROSION CONTROL MATS, SLOPES	4960.000	1.09	5410.72
0375	636-1020	SF	HWY SGN,TP1MAT,REFL SH TP3	430.000	14.53	6252.01
0380	636-1029	SF	HWY SGN,TP2 MATL,REFL SH TP 3	115.000	17.48	2010.48
0385	636-1045	SF	HWY SGN,TP2,REFL SH TP 11	1030.000	18.00	18540.00
0390	636-2070	LF	GALV STEEL POSTS, TP 7	2215.000	6.40	14176.00

STATE HIGHWAY AGENCY

DATE : 03/11/2016
PAGE : 3

JOB ESTIMATE REPORT

0395	636-2080	LF	GALV STEEL POSTS, TP 8	445.000	9.34	4157.14
0400	636-2090	LF	GALV STEEL POSTS, TP 9	195.000	8.12	1583.58
0405	639-2002	LF	STEEL WIRE STRAND CABLE, 3/8	220.000	8.42	1853.11
0410	639-4003	EA	STRAIN POLE, TP III	2.000	6895.79	13791.59
0415	653-1501	LF	THERMO SOLID TRAF ST 5 IN, WHI	610.000	0.81	494.59
0420	653-1704	LF	THERM SOLID TRAF STRIPE,24,WH	1750.000	5.96	10435.58
0425	653-2501	LM	THERMO SOLID TRAF ST, 5 IN, WH	5.200	1790.19	9309.04
0430	653-2502	LM	THERMO SOLID TRAF ST, 5 IN YE	1.600	1738.25	2781.20
0435	653-2804	LM	THERM SOLID TRAF STRIPE, 8,WH	2.400	8370.00	20088.00
0440	653-6004	SY	THERM TRAF STRIPING, WHITE	140.000	3.70	518.39
0445	653-6006	SY	THERM TRAF STRIPING, YELLOW	390.000	3.55	1385.06
0450	639-3014	EA	STEEL STR POLE,TP 4,LUMIN ARM 45' MAST ARM	8.000	13627.91	109023.35
0455	639-4004	EA	STRAIN POLE, TP IV	20.000	7648.78	152975.71
0460	647-1000	LS	TRAF SIGNAL INSTALLATION NO - 1	1.000	45000.00	45000.00
0461	647-1000	LS	TRAF SIGNAL INSTALLATION NO - 2	1.000	45000.00	45000.00
0462	647-1000	LS	TRAF SIGNAL INSTALLATION NO - 3	1.000	45000.00	45000.00
0463	647-1000	LS	TRAF SIGNAL INSTALLATION NO - 4	1.000	80000.00	80000.00
0464	647-1000	LS	TRAF SIGNAL INSTALLATION NO - 5	1.000	80000.00	80000.00
0465	647-1000	LS	TRAF SIGNAL INSTALLATION NO - 6	1.000	80000.00	80000.00
0466	647-1000	LS	TRAF SIGNAL INSTALLATION NO - 7	1.000	80000.00	80000.00
0467	647-1000	LS	TRAF SIGNAL INSTALLATION NO - 8	1.000	80000.00	80000.00
0468	647-1000	LS	TRAF SIGNAL INSTALLATION NO - 9	1.000	45000.00	45000.00
0470	682-6233	LF	CONDUIT, NONMETL, TP 3, 2 IN	1125.000	2.10	2362.50
0475	682-9950	LF	DIRECTIONAL BORE - 3 IN	800.000	8.10	6480.00
0480	682-9950	LF	DIRECTIONAL BORE - 5 IN	300.000	10.80	3240.00
0485	681-4120	EA	LT STD, 12' MH, POST TOP	328.000	2625.00	861000.00
0490	681-6311	EA	LUMINAIRE, TP 3, 110 W, LED	328.000	2376.00	779328.00

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0495	682-1406	LF	CABLE, TP XHHW, AWG NO 6	31163.000	1.43	44563.09	
0500	682-1408	LF	CABLE, TP XHHW, AWG NO 2	62325.000	1.92	119664.00	
0505	682-6222	LF	CONDUIT, NONMETL, TP 2, 2 IN	30912.000	6.75	208656.00	
0510	682-6225	LF	CONDUIT, NONMETL, TP 2, 2 1/2 IN	276.000	8.15	2249.40	
0515	682-9000	LS	MAIN SVC PICK UP POINT 1	1.000	8994.55	8994.55	
0520	682-9000	LS	MAIN SVC PICK UP POINT 2	1.000	8994.55	8994.55	
0525	682-9000	LS	MAIN SVC PICK UP POINT 3	1.000	8994.55	8994.55	
0530	682-9000	LS	MAIN SVC PICK UP POINT 4	1.000	8994.55	8994.55	
0535	682-9000	LS	MAIN SVC PICK UP POINT 5	1.000	8994.55	8994.55	
0540	682-9000	LS	MAIN SVC PICK UP POINT 6	1.000	8994.55	8994.55	
0545	682-9000	LS	MAIN SVC PICK UP POINT 7	1.000	8994.55	8994.55	
0550	682-9000	LS	MAIN SVC PICK UP POINT 8	1.000	8994.55	8994.55	
0555	682-9022	EA	ELEC JCT BX,REF PLASTIC MORTAR	23.000	657.15	15114.45	
0560	682-9950	LF	DIRECTIONAL BORE - 2 IN	7084.000	6.11	43283.24	

ITEM TOTAL						10067502.83	
INFLATED ITEM TOTAL						10067502.83	
TOTALS FOR JOB 0009400							

ESTIMATED COST:						11104162.63	
CONTINGENCY PERCENT (0.0):						0.00	
ESTIMATED TOTAL:						11104162.63	

PROJ. NO.		CALL NO.
P.I. NO.	0009400	
DATE	11/4/2015	

INDEX (TYPE)	DATE	INDEX
REG. UNLEADED	Nov-15	\$ 2.054
DIESEL		\$ 2.430
LIQUID AC		\$ 413.00

Link to Fuel and AC Index:

<http://www.dot.ga.gov/doingbusiness/Materials/Pages/asphaltcementindex.aspx>

LIQUID AC ADJUSTMENTS

PA=[((APM-APL)/APL)]xTMTxAPL

Asphalt

Price Adjustment (PA)					20939.1	\$	20,939.10
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	\$	660.80			
Monthly Asphalt Cement Price month project let (APL)			\$	413.00			
Total Monthly Tonnage of asphalt cement (TMT)					84.5		

ASPHALT	Tons	%AC	AC ton
Leveling		5.0%	0
12.5 OGFC		5.0%	0
12.5 mm	1010	5.0%	50.5
9.5 mm SP		5.0%	0
25 mm SP		5.0%	0
19 mm SP	680	5.0%	34
	1690		84.5

BITUMINOUS TACK COAT

Price Adjustment (PA)				\$	335.26	\$	335.26
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	\$	660.80			
Monthly Asphalt Cement Price month project let (APL)			\$	413.00			
Total Monthly Tonnage of asphalt cement (TMT)					1.35295679		

Bitum Tack

Gals	gals/ton	tons
315	232.8234	1.35295679

BITUMINOUS TACK COAT (surface treatment)

Price Adjustment (PA)					0	\$	-
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	\$	660.80			
Monthly Asphalt Cement Price month project let (APL)			\$	413.00			
Total Monthly Tonnage of asphalt cement (TMT)					0		

Bitum Tack	SY	Gals/SY	Gals	gals/ton	tons
Single Surf. Trmt.		0.20	0	232.8234	0
Double Surf.Trmt.		0.44	0	232.8234	0
Triple Surf. Trmt		0.71	0	232.8234	0

TOTAL LIQUID AC ADJUSTMENT	\$	21,274.36
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GEORGIA DEPARTMENT OF TRANSPORTATION
PRELIMINARY ROW COST ESTIMATE SUMMARY

Date: 12/7/2015 Project: 0009400
Revised: County: Dekalb County
PI: 0009400
Description: Buford Highway/SR 13 Afton Lane to Shallowford
Project Termini: Buford Highway/SR 13 Afton Lane to Shallowford
Existing ROW: Varies
Parcels: 90 Required ROW: Varies

Land and Improvements _____ \$2,518,192.50

Proximity Damage \$200,000.00

Consequential Damage \$365,000.00

Cost to Cures \$265,000.00

Trade Fixtures \$0.00

Improvements \$145,000.00

Valuation Services _____ \$497,500.00

Legal Services _____ \$585,750.00

Relocation _____ \$180,000.00

Demolition _____ \$0.00

Administrative _____ \$757,500.00

TOTAL ESTIMATED COSTS _____ \$4,538,942.50

TOTAL ESTIMATED COSTS (ROUNDED) _____ \$4,539,000.00

Preparation Credits	Hours	Signature

Prepared By: Dashone Alexander CG#:286999 12/07/2015 (DATE)

Approved By: Dashone Alexander CG#: 286999 12/07/2015 (DATE)

NOTE: No Market Appreciation is included in this Preliminary Cost Estimate

INTER-DEPARTMENT CORRESPONDENCE

ATTACHMENT 4

Crash Summaries

P.I. No. 0009400 - SR 13/Buford Highway from Afton Lane to Shallowford Terrace
Accident History

Year	Accidents								Injury	Fatality	Pedestrians* Involved
	Rear- End	Side- swipe	Angle	Head- on	Struck Object	Run Off	Other	Total			
2003	71	24	55	3			14	167	77	0	4
2004	62	20	40	6			7	135	74	1	4
2005	94	21	83	6			11	215	112	2	3
2006	74	20	55	5			14	168	62	0	4
2007	70	21	40	4			7	142	60	0	3
2008	57	24	42	8			12	143	59	0	2
2009	35	18	43	7			5	108	50	0	3
2010	28	16	42	3			7	96	41	2	2
2011	56	19	43	6			12	136	71	2	1
2012	43	15	39	7			7	111	33	0	1
2013	43	27	99	5			13	187	46	0	2
Totals	633	225	581	60			109	1608	685	7	29

* Pedestrians include bicycle and pedestrian traffic.

ATTACHMENT 5

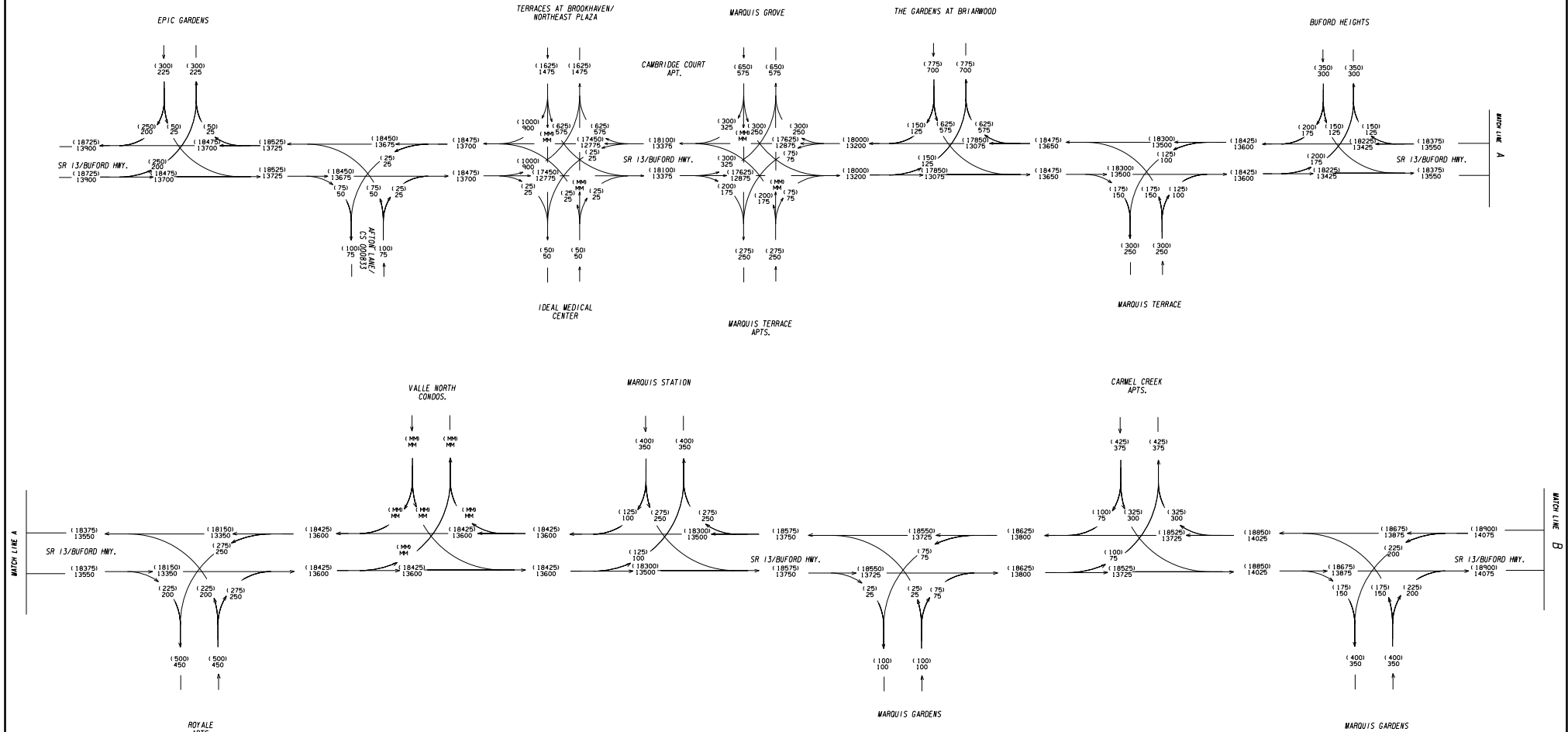
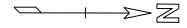
Traffic Diagrams

DATE: 1/2015
USER: LRW

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	0009400	1	12

BUILD = NO-BUILD

DEKALB COUNTY



CSSTP-0009-00(400)
P.I. * 0009400
DEKALB COUNTY
SR 13 FROM AFTON LANE TO
SHALLOWFORD TERRACE-PHASE 11

ADT
2039 = (000)
2019 = 000

SR 13/BUFORD HWY.
24-HR. T. = 4.5%
S.U.T. = 4.0%
COMB. T. = 0.5%

REVISION DATES

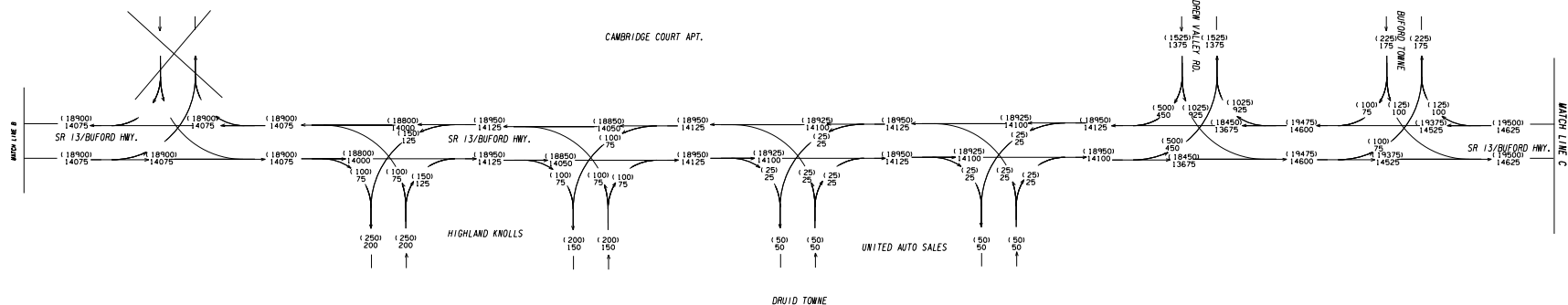
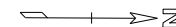
STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: PLANNING

DESIGN TRAFFIC
ADT PROJECTIONS

DATE: JAN, 2015
PREPARED BY: LRW

DRAWING No.
10-1

DEKALB COUNTY

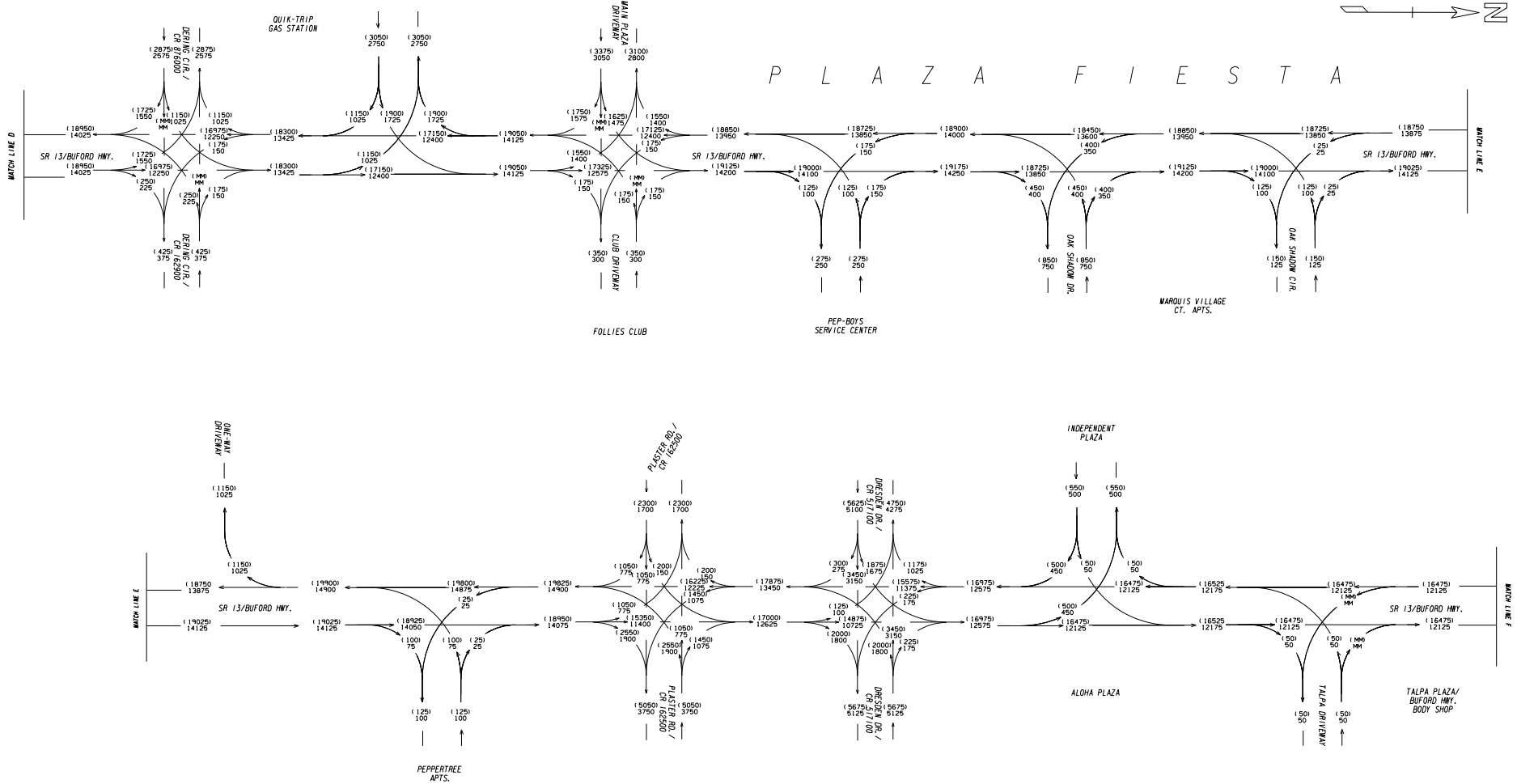
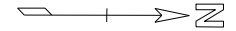


DATE: 1/1/2015
USER: LRW

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	0009400	3	12

BUILD = NO-BUILD

DEKALB COUNTY



CSSTP-0009-00(400)
P. I. * 0009400
DEKALB COUNTY
SR 13 FROM AFTON LANE TO
SHALLOWFORD TERRACE-PHASE II

ADT
2039 = (000)
2019 = 000

SR 13/BUFORD HWY.
24-HR. T. - 4.5%
S. U. T. - 4.0%
COMB. T. - 0.5%

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: PLANNING

DESIGN TRAFFIC
ADT PROJECTIONS

DATE: JAN, 2015
PREPARED BY: LRW

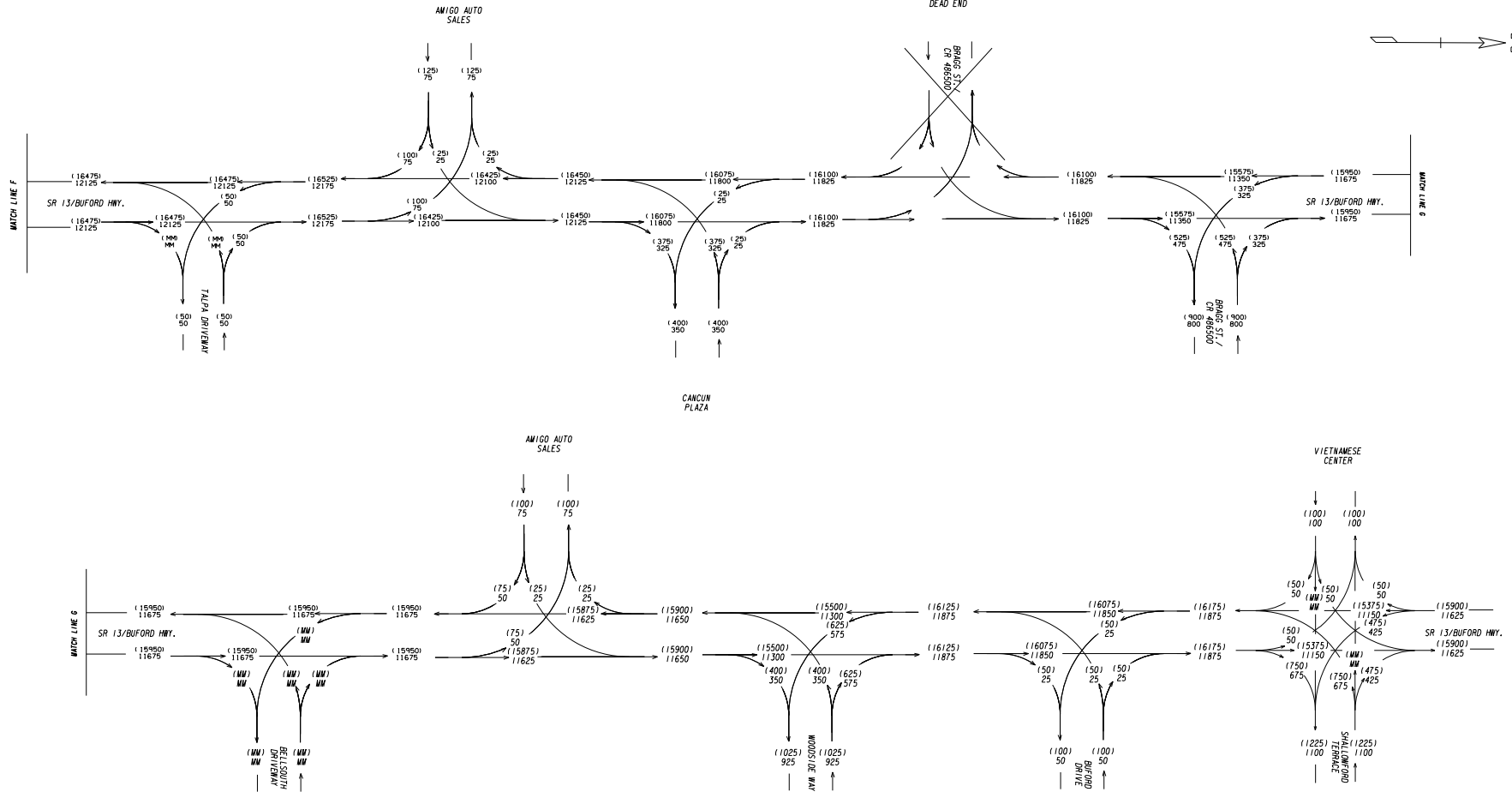
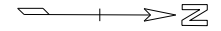
DRAWING NO.
10-3

DATE: 1/2015
USER: LRW

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	0009400	4	12

BUILD = NO-BUILD

DEKALB COUNTY



CSSTP-0009-00(400)
P. I. * 0009400
DEKALB COUNTY
SR 13 FROM AFTON LANE TO
SHALLOWFORD TERRACE-PHASE I I

ADT
2039 = (000)
2019 = 000

SR 13/Buford Hwy.
24-HR. T. = 4.5%
S.U.T. = 4.0%
COMB. T. = 0.5%

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: PLANNING

DESIGN TRAFFIC
ADT PROJECTIONS

DATE: JAN, 2015
PREPARED BY: LRW

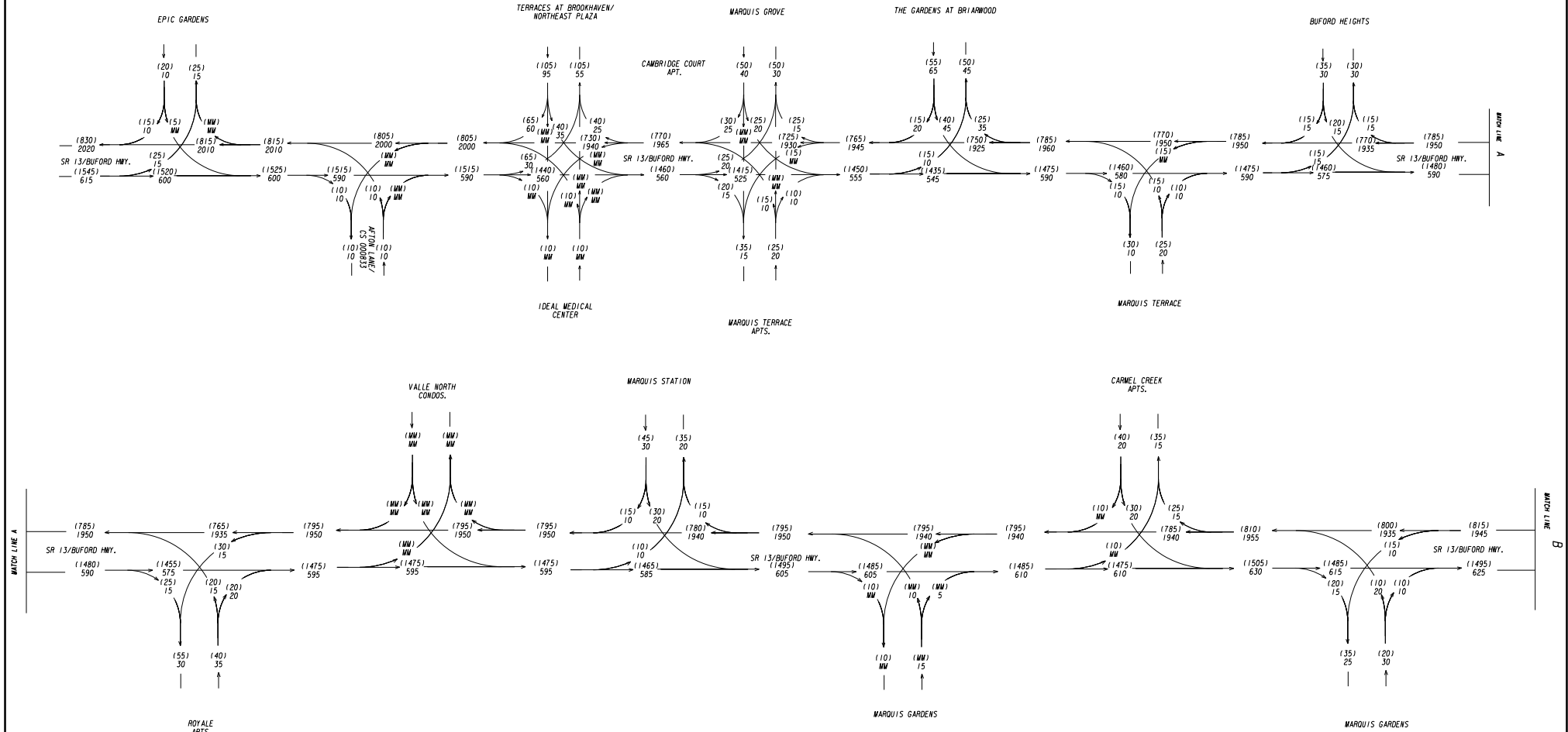
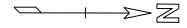
DRAWING No.
10-4

DATE: 1/2015
USER: LRW

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	0009400	9	12

BUILD = NO-BUILD

DEKALB COUNTY



CSSTP-0009-00(400)
P. I. * 0009400
DEKALB COUNTY
SR 13 FROM AFTON LANE TO
SHALLOWFORD TERRACE-PHASE II

2019 DHV
PM = (000)
AM = 000

SR 13/BUFORD HWY.
T. = 7.5%
S.W.T. = 7.0%
COMB.T. = 0.5%

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: PLANNING

**BUILD • NO-BUILD
BASE YEAR DHV**

DATE: JAN, 2015
PREPARED BY: LRW

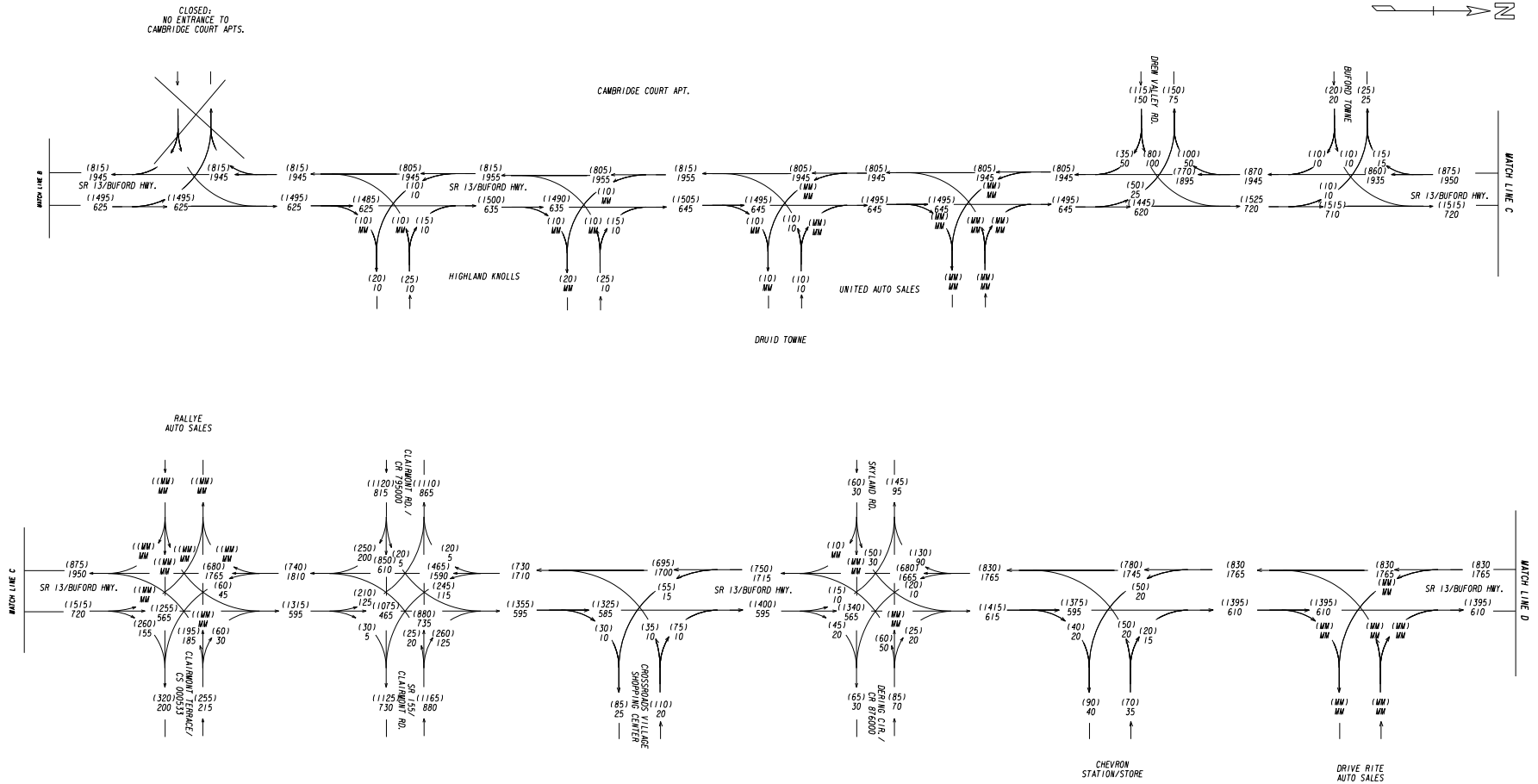
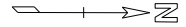
DRAWING NO.
10-5

DATE: 1/7/2015
USER: LRW

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	0009400	10	12

BUILD = NO-BUILD

DEKALB COUNTY



CSSTP-0009-00(400)
P. I. * 0009400
DEKALB COUNTY
SR 13 FROM AFTON LANE TO
SHALLOWFORD TERRACE-PHASE II

2019 DHV
PM = (000)
AM = 000

SR 13/BUFORD HWY.
T. = 7.5%
S.U.T. = 7.0%
COMB. T. = 0.5%

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: PLANNING

**BUILD • NO-BUILD
BASE YEAR DHV**

DATE: JAN, 2015
PREPARED BY: LRW

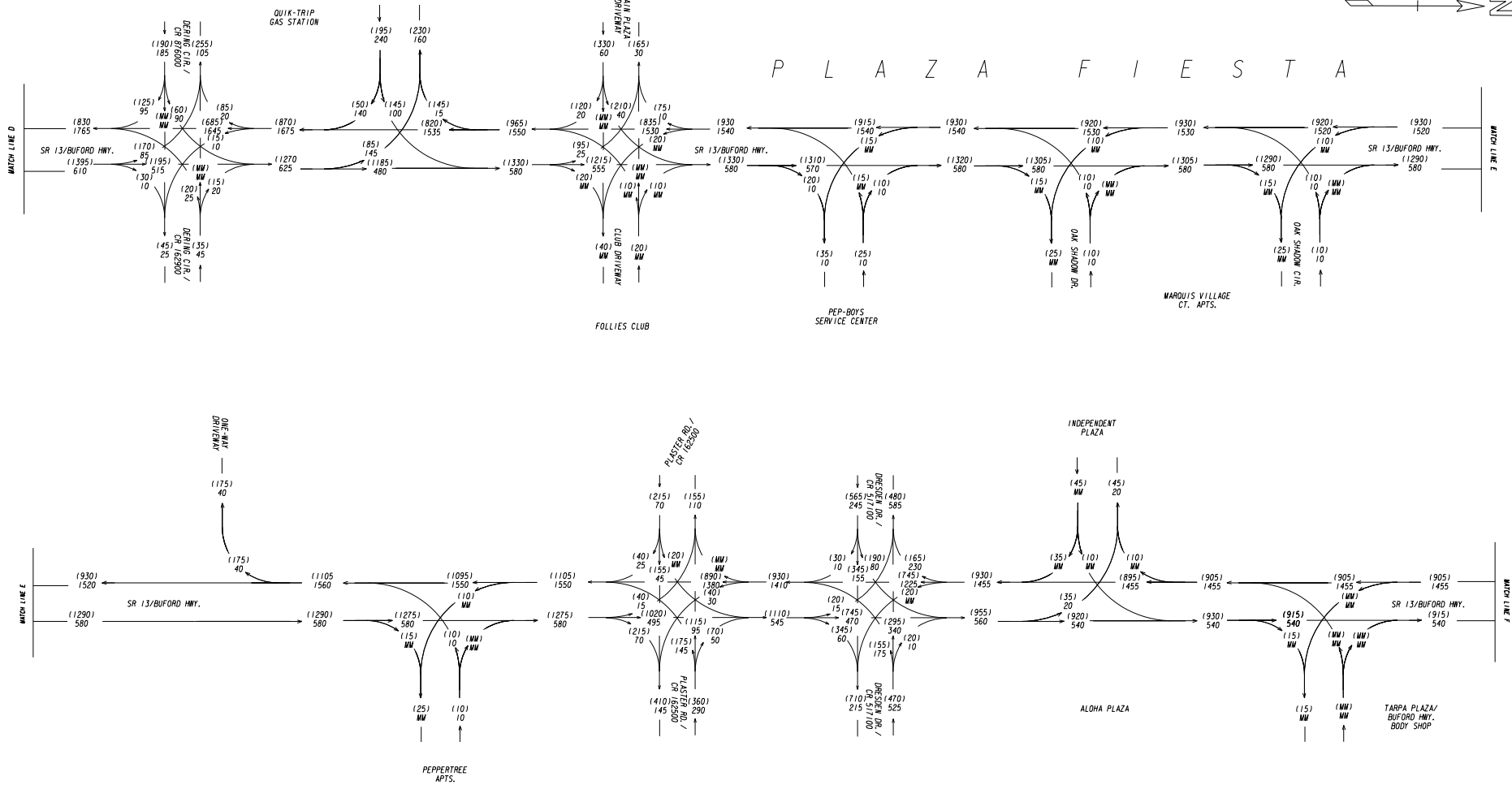
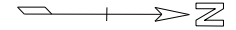
DRAWING No.
10-6

DATE: 1/2015
USER: LRW

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	0009400	11	12

BUILD = NO-BUILD

DEKALB COUNTY



CSSTP-0009-00(400)
P.I. * 0009400
DEKALB COUNTY
SR 13 FROM AFTON LANE TO
SHALLOWFORD TERRACE-PHASE 11

2019 DHV
PM = (000)
AM = 000

SR 13/BUFORD HWY.
T = 7.5%
S.U.T. = 7.0%
COMB.T. = 0.5%

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: PLANNING

**BUILD • NO-BUILD
BASE YEAR DHV**

DATE: JAN, 2015
PREPARED BY: LRW

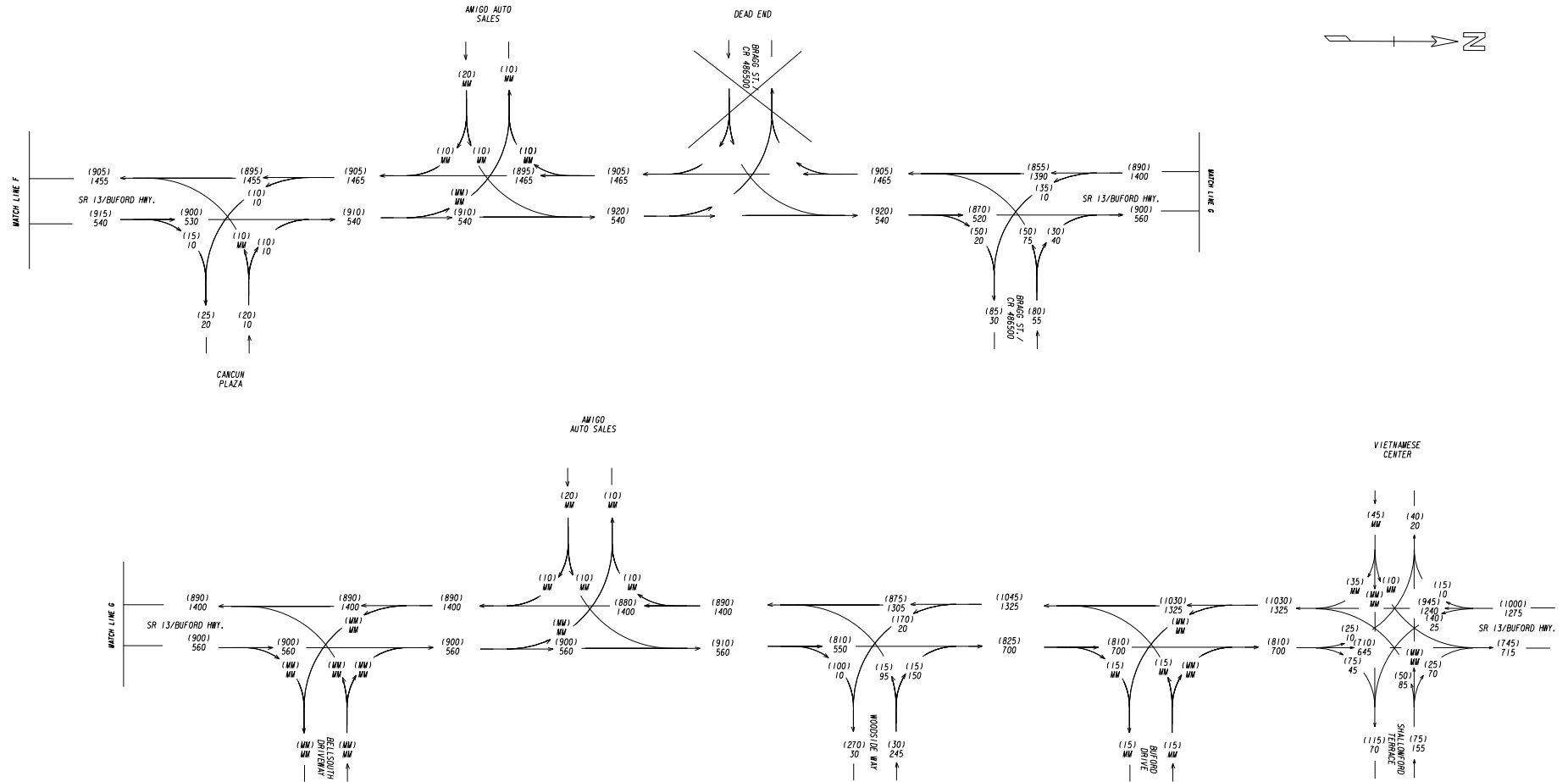
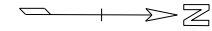
DRAWING No.
10-7

DATE: 1/7/2015
USER: LRW

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	0009400	12	12

BUILD = NO-BUILD

DEKALB COUNTY



CSSTP-0009-00(400)
P. I. * 0009400
DEKALB COUNTY
SR 13 FROM AFTON LANE TO
SHALLOWFORD TERRACE-PHASE II

2019 DHV
PM = (000)
AM = 000

SR 13/BUFORD HWY.
T. = 7.5%
S.U.T. = 1.0%
COMB. T. = 0.5%

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: PLANNING

**BUILD • NO-BUILD
BASE YEAR DHV**

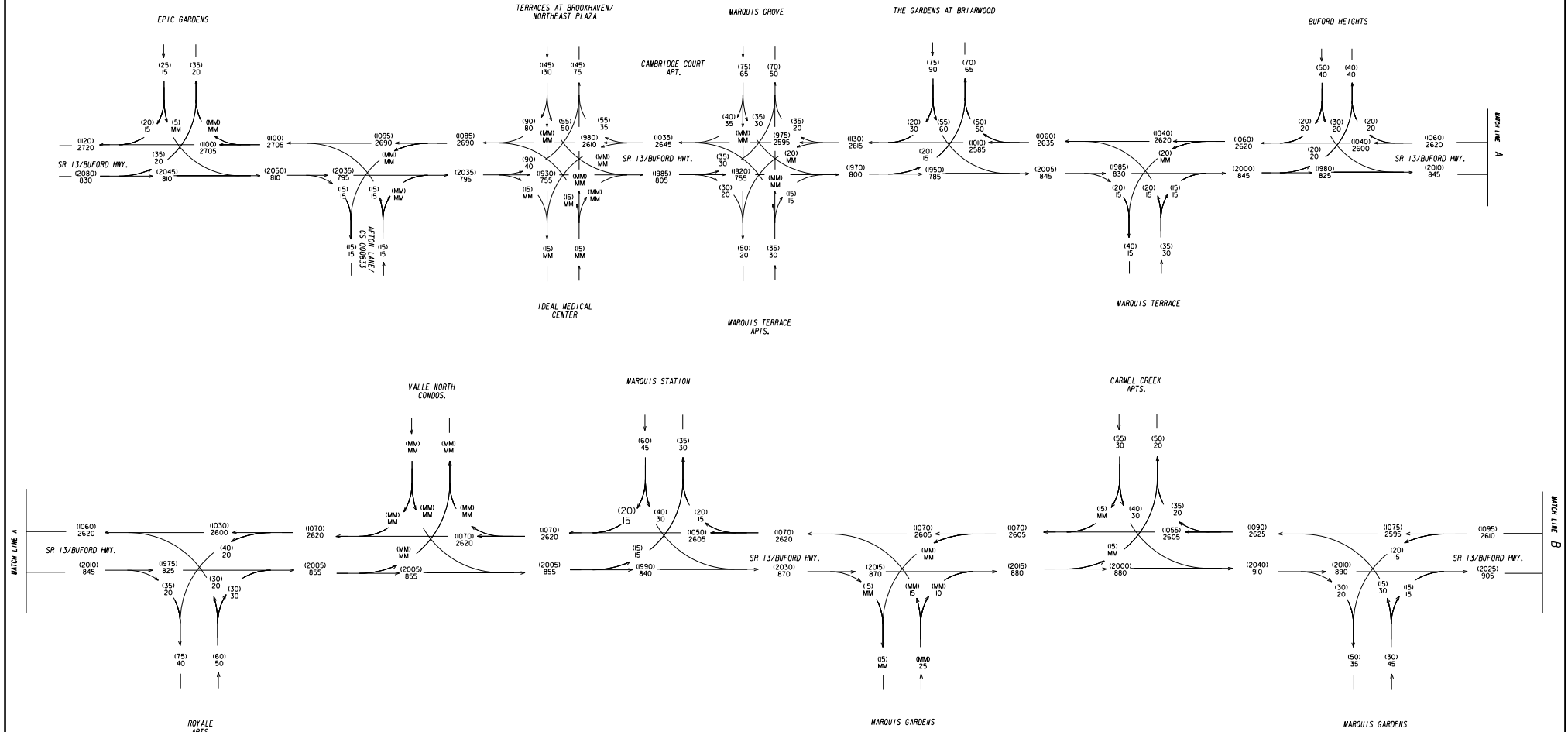
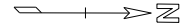
DATE: JAN, 2015
PREPARED BY: LRW

DRAWING NO.
10-8

DATE: 1/2015
USER: LRW

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	0009400	5	12

DEKALB COUNTY



CSSTP-0009-00(400)
P. I. * 0009400
DEKALB COUNTY
SR 13 FROM AFTON LANE TO
SHALLOWFORD TERRACE-PHASE II

2039 DHV
PM = (000)
AM = 000

SR 13/BUFORD HWY.
T. = 7.5%
S.U.T. = 7.0%
COMB. T. = 0.5%

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: PLANNING

DESIGN YEAR
2039-DHV

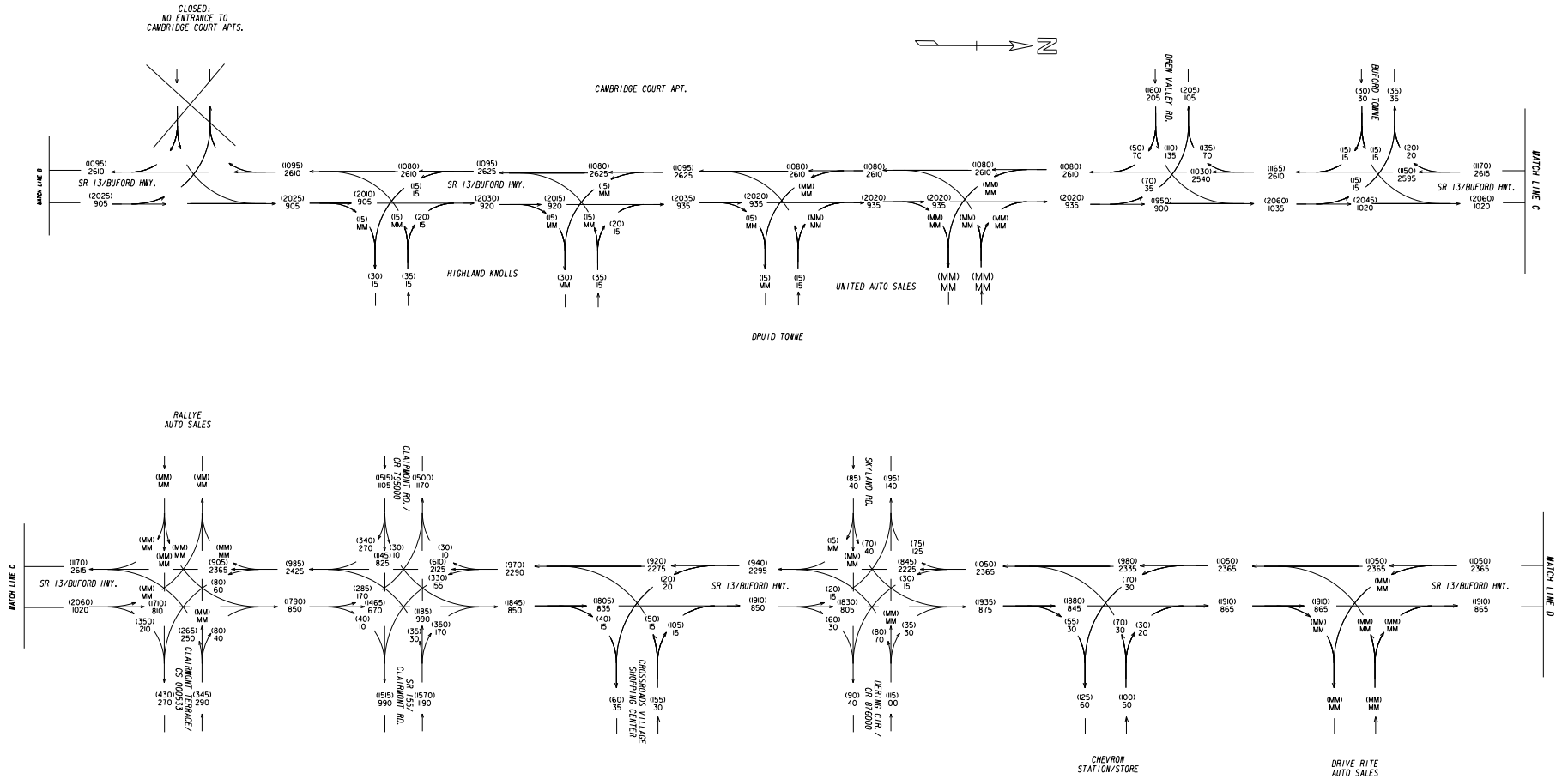
DATE: JAN, 2015
PREPARED BY: LRW

DRAWING No.
10-9

DATE: 1/2015
USER: LRW

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	0009400	6	12

DEKALB COUNTY



CSSTP-0009-00(400)
P. I. * 0009400
DEKALB COUNTY
SR 13 FROM AFTON LANE TO
SHALLOWFORD TERRACE-PHASE II

2039 DHV
PM = (000)
AM = 000

SR 13/BUFORD HWY.
I. T. = 7.5%
S. I. T. = 7.0%
COMB. T. = 0.5%

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: PLANNING

DESIGN YEAR
2039-DHV

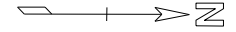
DATE: JAN, 2015
PREPARED BY: LRW

DRAWING No.
10-10

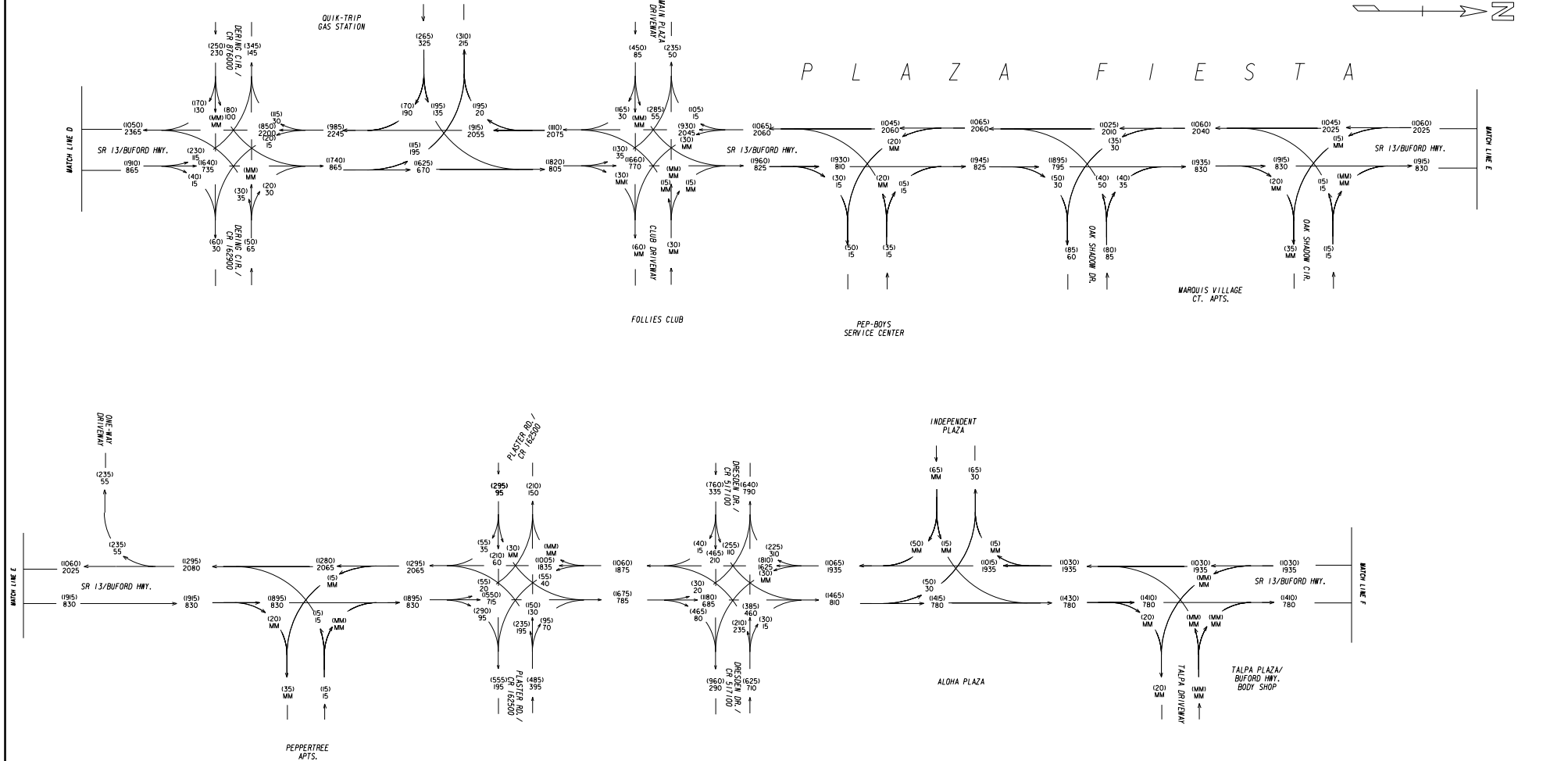
DATE: 1/1/2015
USER: LRW

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	0009400	7	12

DEKALB COUNTY



P L A Z A F I E S T A



CSSTP-0009-00(400)
P. I. * 0009400
DEKALB COUNTY
SR 13 FROM AFTON LANE TO
SHALLOWFORD TERRACE-PHASE II

2039 DHV
PM = (000)
AM = 000

SR 13/BUFORD HWY.
T. = 7.5%
S. U. T. = 7.0%
COMB. T. = 0.5%

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: PLANNING

DESIGN YEAR
2039-DHV

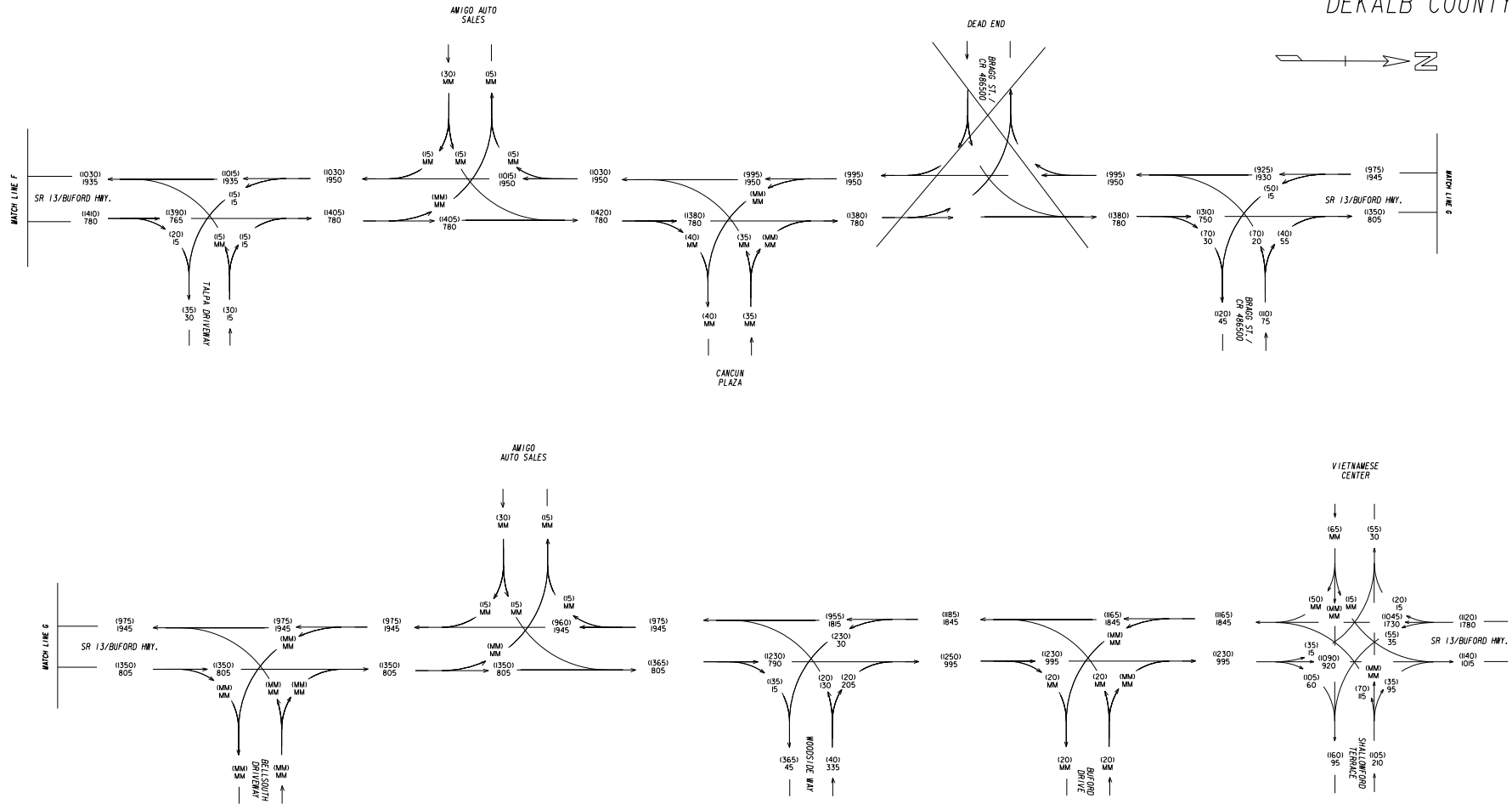
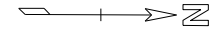
DATE: JAN, 2015
PREPARED BY: LRW

DRAWING No.
10-11

DATE: 1/7/2015
USER: LRW

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	0009400	8	12

DEKALB COUNTY



CSSTP-0009-00(400)
P. I. * 0009400
DEKALB COUNTY
SR 13 FROM AFTON LANE TO
SHALLOWFORD TERRACE-PHASE II

2039 DHV
PM = (000)
AM = 000

SR 13/BUFORD HWY.
T. = 7.5%
S. U. T. = 7.0%
COMB. T. = 0.5%

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: PLANNING

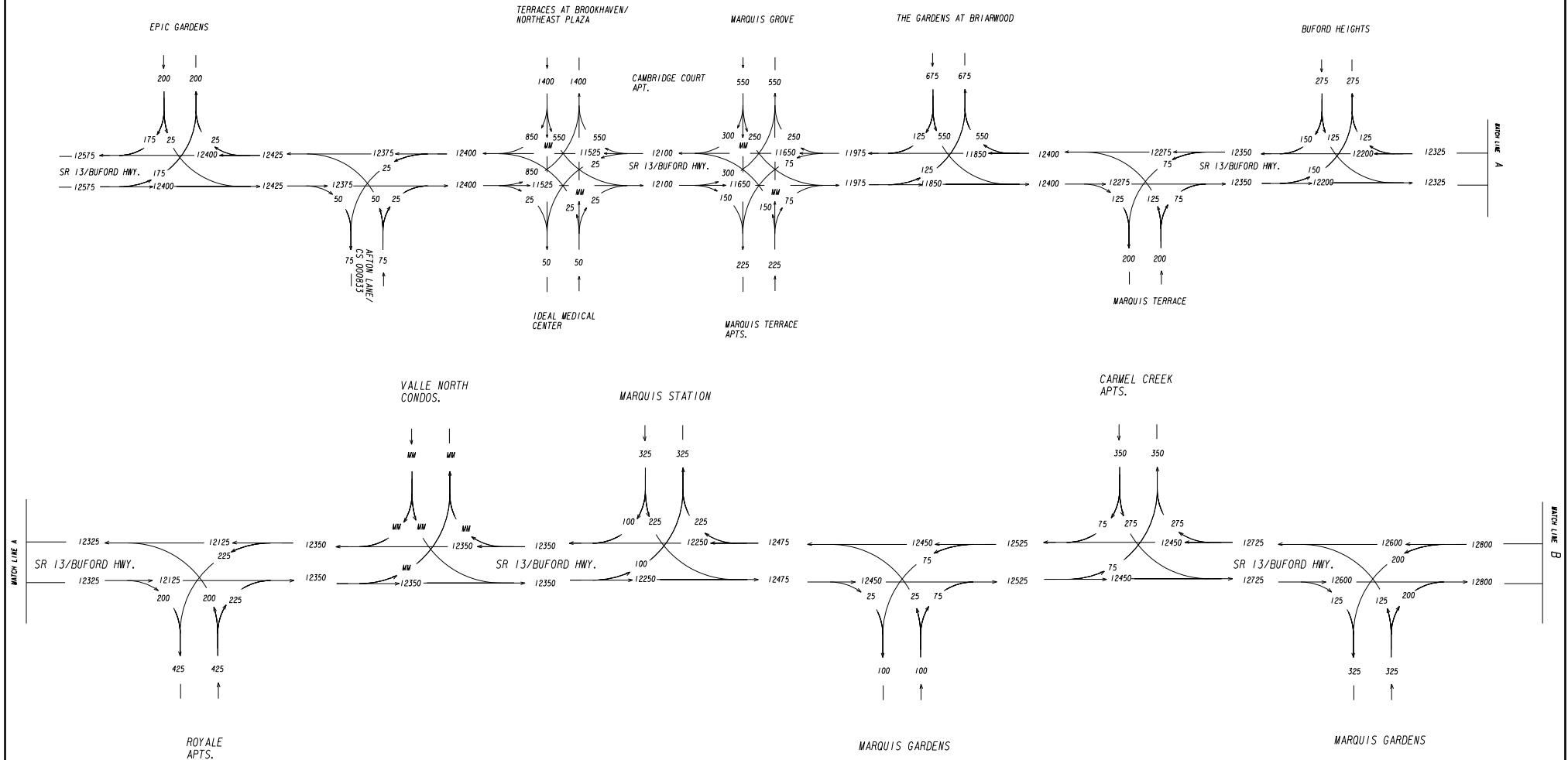
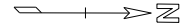
DESIGN YEAR
2039-DHV
DATE: JAN, 2015
PREPARED BY: LRW

DRAWING NO.
10-12

DATE: 1/2015
USER: LRW

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	0009400	1	8

DEKALB COUNTY



CSSTP-0009-00(400)
P. I. * 0009400
DEKALB COUNTY
SR 13 FROM AFTON LANE TO
SHALLOWFORD TERRACE-PHASE II

EXISTING ADT 2014

SR 13/BUFORD HWY.
24-HR. T. * 4.5%
S.U.T. * 4.0%
COMB. T. * 0.5%

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: PLANNING

TRAFFIC DESIGN
EXISTING ADT

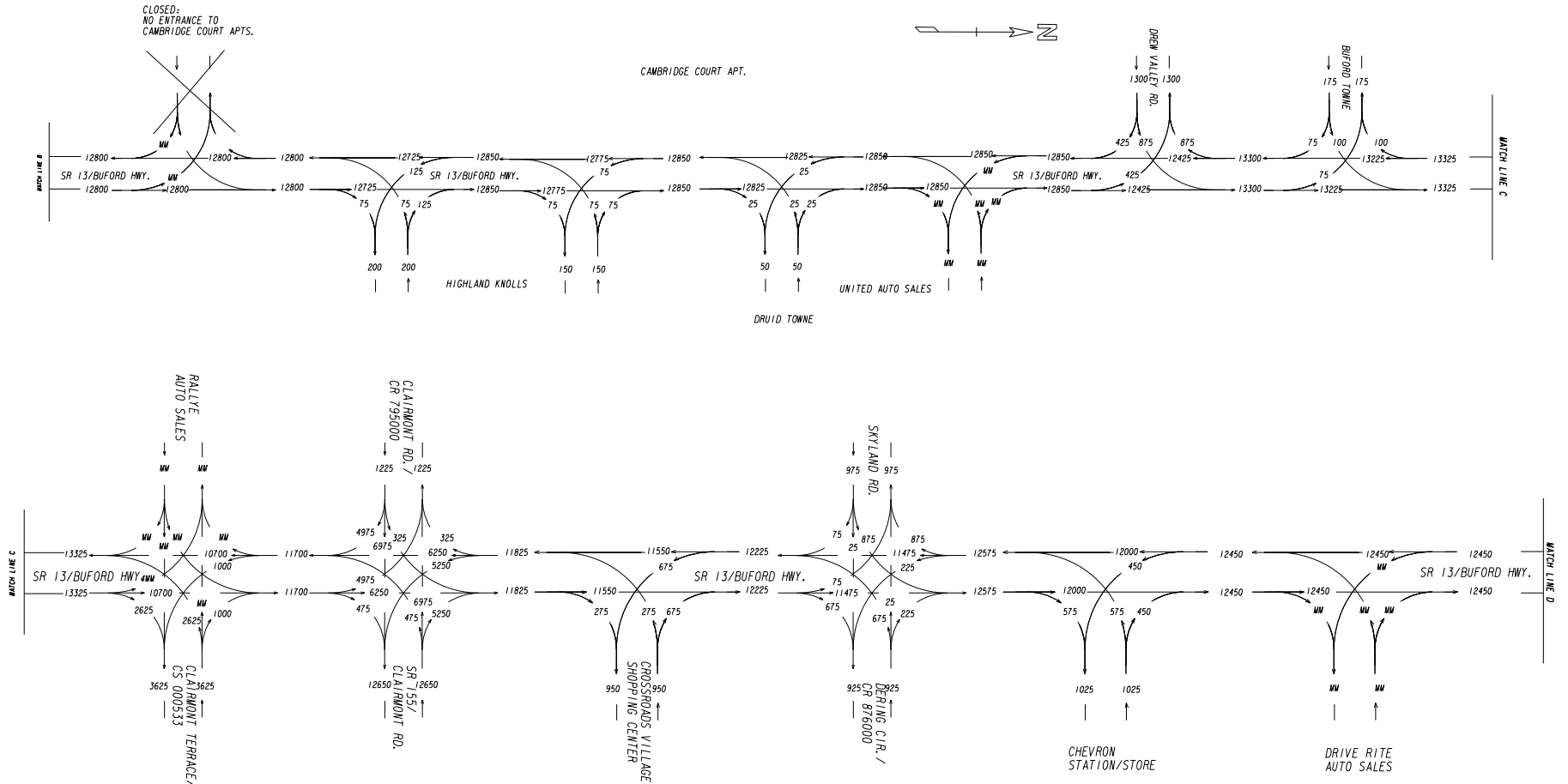
DATE: JAN, 2015
PREPARED BY: LRW

DRAWING NO.
10-1

DATE: 1/7/2015
USER: LRW

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	0009400	2	8

DEKALB COUNTY



CSSTP-0009-00(400)
P. I. * 0009400
DEKALB COUNTY
SR 13 FROM AFTON LANE TO
SHALLOWFORD TERRACE-PHASE II

EXISTING ADT 2014

SR 13/Buford Hwy.
24-Hr. T. - 4.5%
S. U. T. - 4.0%
Comb. T. - 0.5%

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: PLANNING

TRAFFIC DESIGN
EXISTING ADT

DATE: JAN, 2015
PREPARED BY: LRW

DRAWING No.
10-2



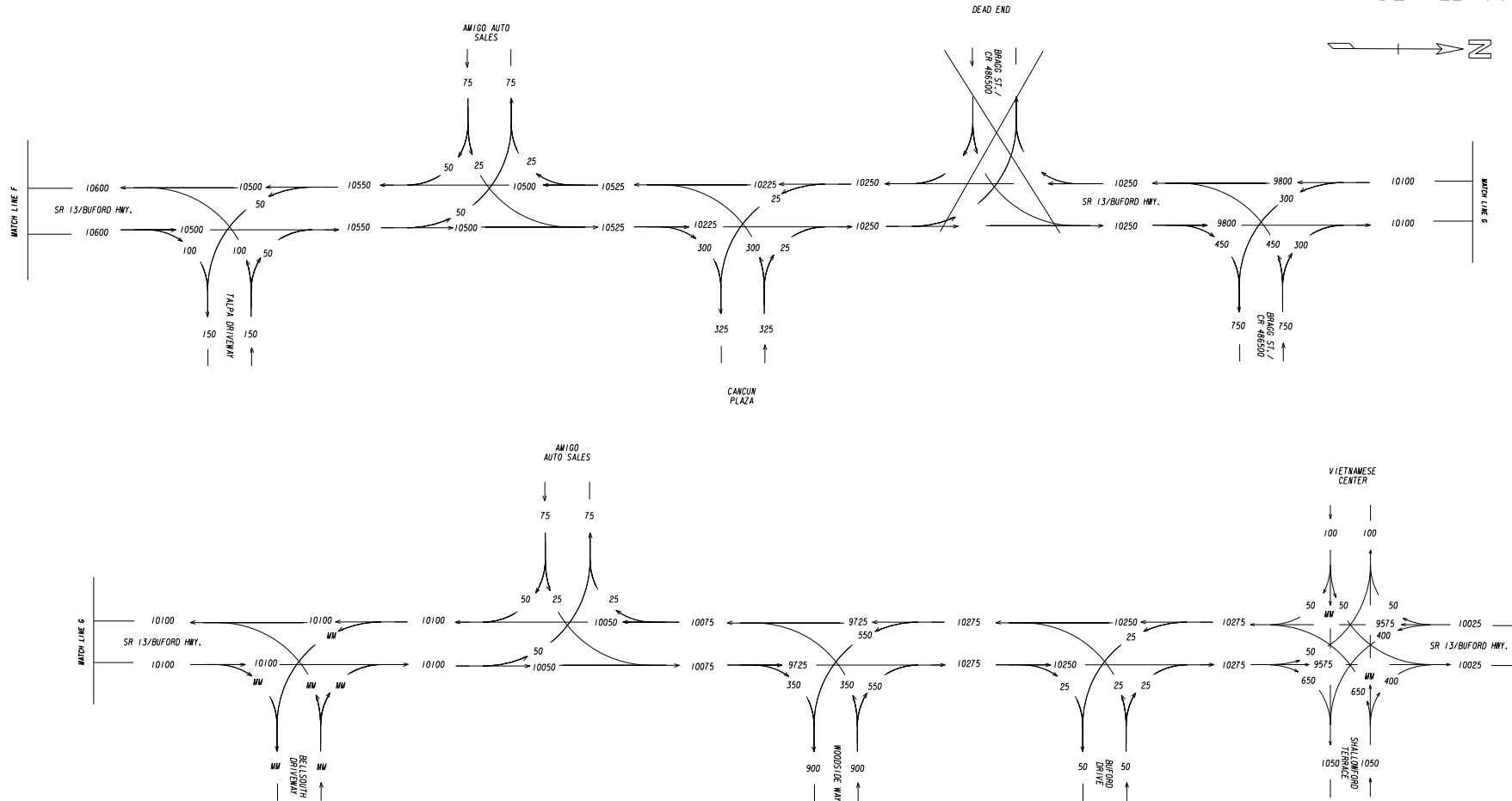
SR 13/BUFORD HWY.
24-HR. T. • 4.5%
S. U. T. • 4.0%
COMB. T. • 0.5%

REVISION DATES			STATE OF GEORGIA	
			DEPARTMENT OF TRANSPORTATION	
			OFFICE: PLANNING	
			TRAFFIC DESIGN EXISTING ADT	
			DATE: JAN, 2015	
			PREPARED BY: LRW	
			DRAWING No. 10-3	

DATE: 1/2015
USER: LRW

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	0009400	4	8

DEKALB COUNTY



CSSTP-0009-00(400)
P. I. * 0009400
DEKALB COUNTY
SR 13 FROM AFTON LANE TO
SHALLOWFORD TERRACE-PHASE II

EXISTING ADT 2014

SR 13/BUFORD HWY.
24-HR. T. - 4.5%
S. U. T. - 4.0%
COMB. T. - 0.5%

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: PLANNING

TRAFFIC DESIGN
EXISTING ADT

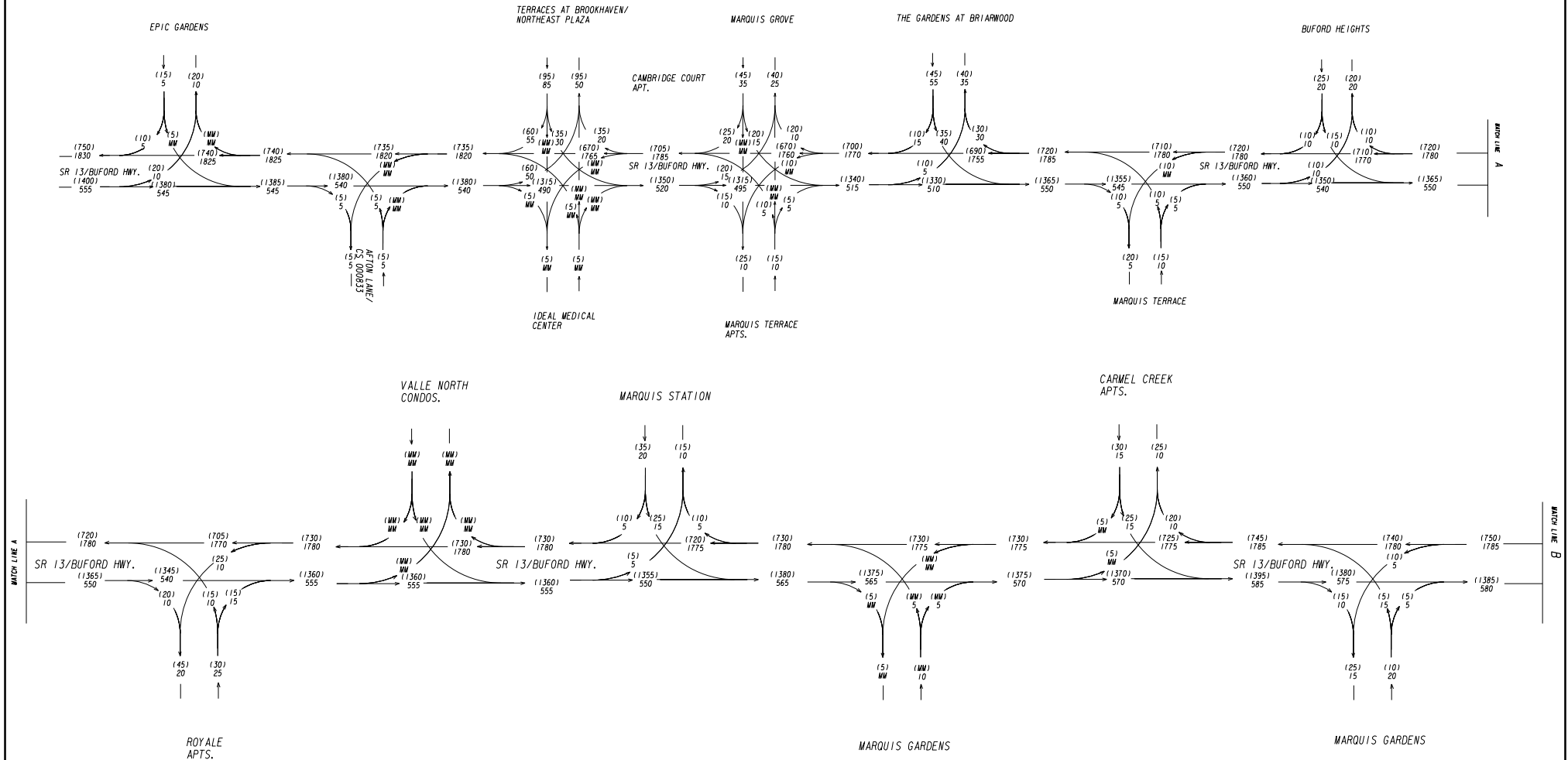
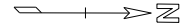
DATE: JAN, 2015
PREPARED BY: LRW

DRAWING No.
10-4

DATE: 1/2015
USER: LRW

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	0009400	5	8

DEKALB COUNTY



CSSTP-0009-00(400)
P. I. * 0009400
DEKALB COUNTY
SR 13 FROM AFTON LANE TO
SHALLOWFORD TERRACE-PHASE II

EXISTING DHV 2014

SR 13/BUFORD HWY.
T. = 7.5%
S. U. T. = 7.0%
COMB. T. = 0.5%

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: PLANNING

TRAFFIC DESIGN
EXISTING DHV

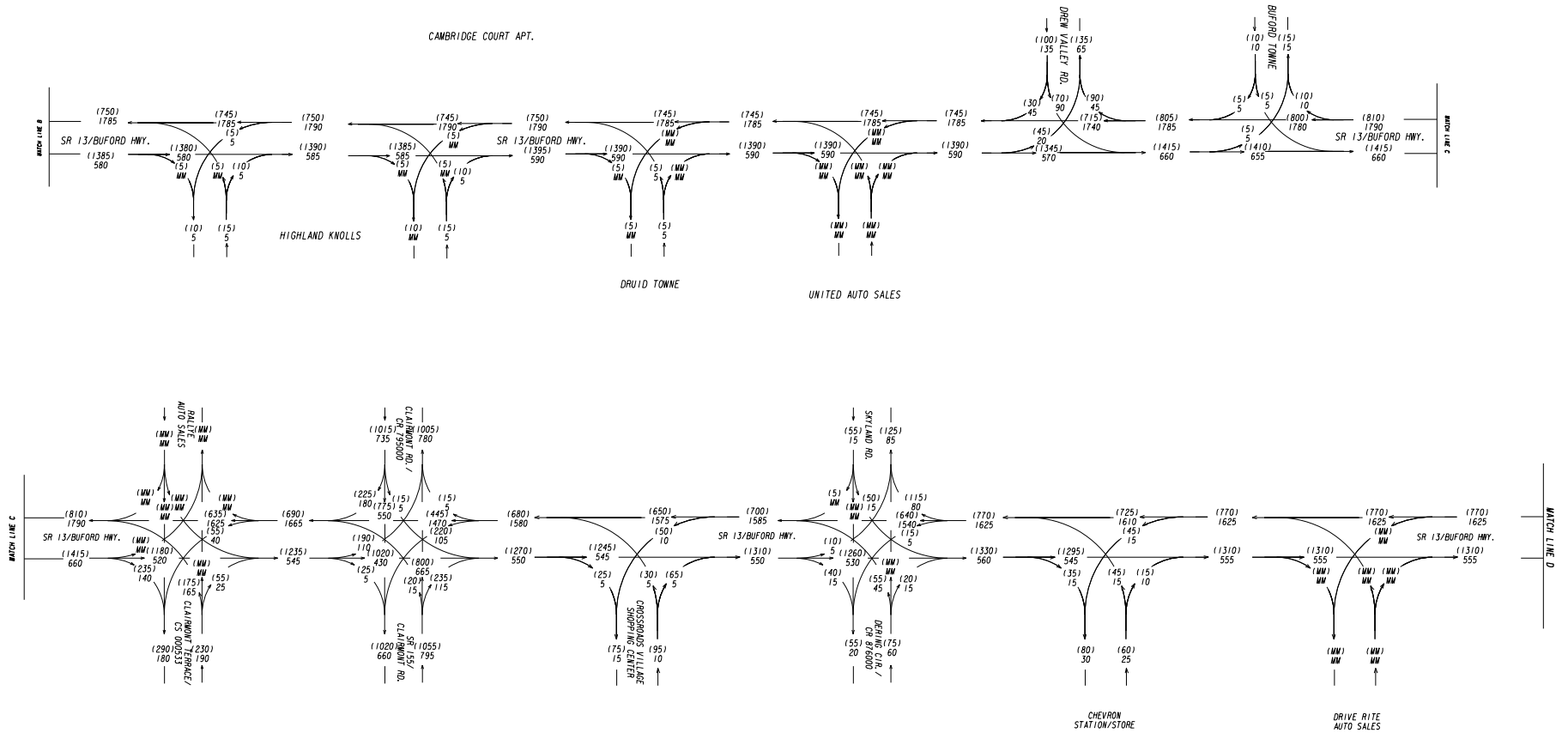
DATE: JAN, 2015
PREPARED BY: LRW

DRAWING No.
10-5

DATE: 1/7/2015
USER: LRW

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	0009400	6	8

DEKALB COUNTY



CSSTP-0009-00(400)
P. I. * 0009400
DEKALB COUNTY
SR 13 FROM AFTON LANE TO
SHALLOWFORD TERRACE-PHASE II

EXISTING DHV 2014

SR 13/BUFORD HWY.
T. - 7.5%
S. U. T. - 7.0%
COMB. T. - 0.5%

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: PLANNING

TRAFFIC DESIGN
EXISTING DHV

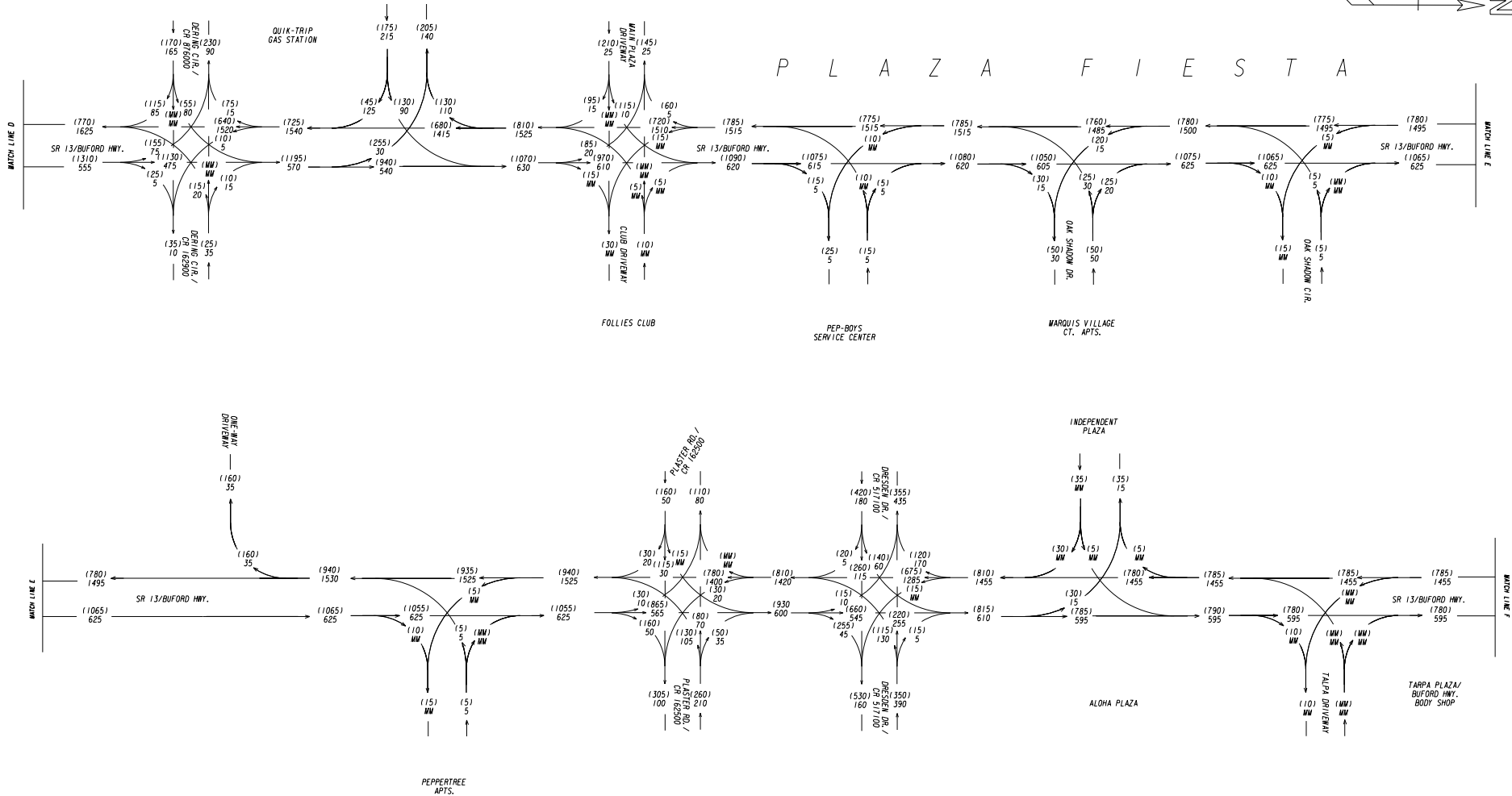
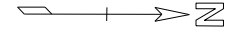
DATE: JAN, 2015
PREPARED BY: LRW

DRAWING No.
10-6

DATE: 1/2015
USER: LRW

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	0009400	7	8

DEKALB COUNTY



CSSTP-0009-00(400)
P. I. * 0009400
DEKALB COUNTY
SR 13 FROM AFTON LANE TO
SHALLOWFORD TERRACE-PHASE II

EXISTING DHV 2014

SR 13/BUFORD HWY.
T. - 7.5%
S. U. T. - 7.0%
COMB. T. - 0.5%

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: PLANNING

TRAFFIC DESIGN
EXISTING DHV

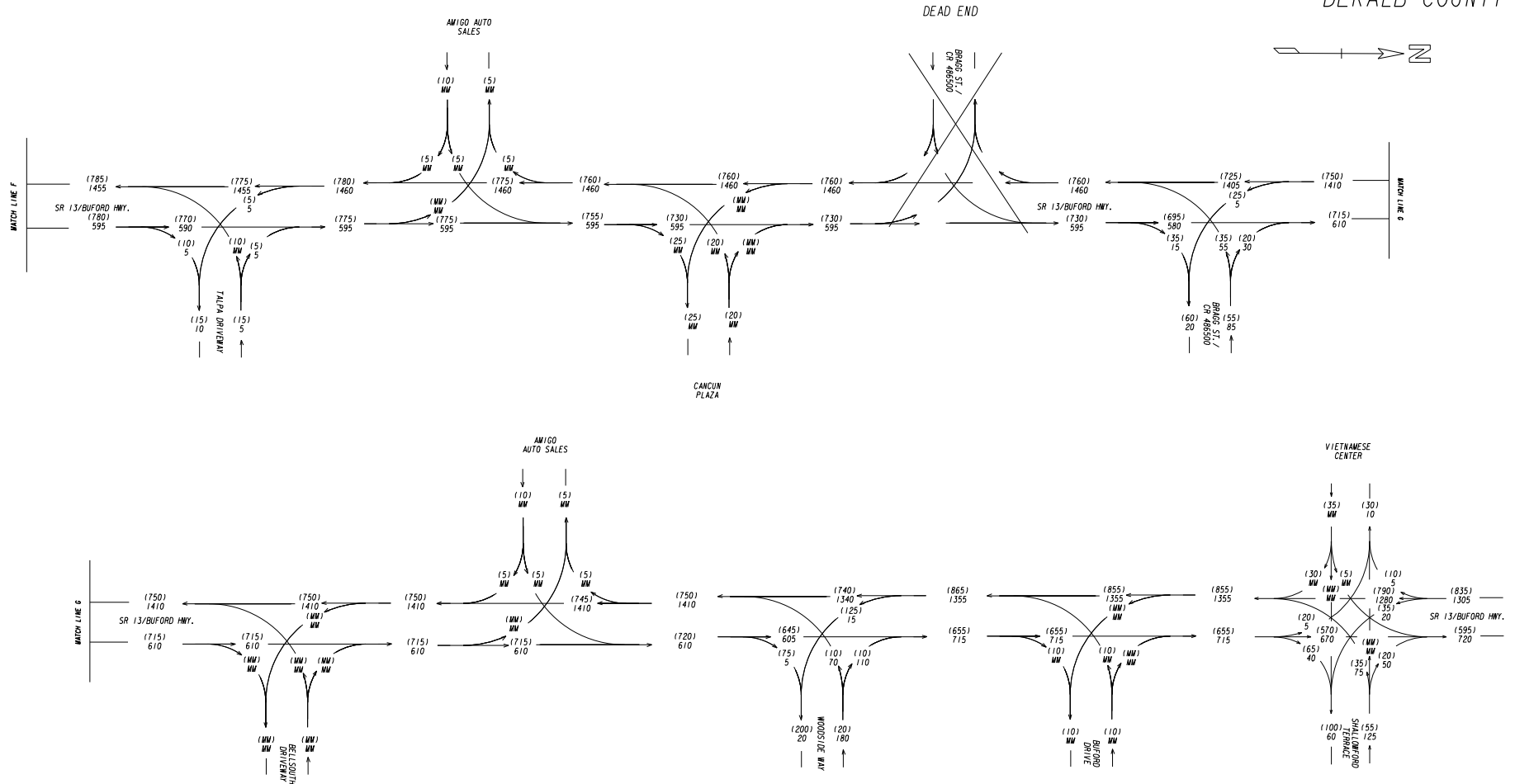
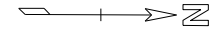
DATE: JAN, 2015
PREPARED BY: LRW

DRAWING No.
10-7

DATE: 1/2015
USER: LRW

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	0009400	8	8

DEKALB COUNTY



CSSTP-0009-00(400)
P. I. * 0009400
DEKALB COUNTY
SR 13 FROM AFTON LANE TO
SHALLOWFORD TERRACE-PHASE II

EXISTING DHV 2014

SR 13/BUFORD HWY.
T. = 7.5%
S.W.T. = 7.0%
COMB. T. = 0.5%

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: PLANNING

TRAFFIC DESIGN
EXISTING DHV

DATE: JAN, 2015
PREPARED BY: LRW

DRAWING NO.
10-8

ATTACHMENT 6

Capacity Analysis Summary

Synchro modeling has been done and the full report including 2014 existing data and build and no-build data sets for 2019 and 2039 is available upon request.

ATTACHMENT 7

TE Reports

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

TRAFFIC ENGINEERING REPORT

For the intersection of:
STATE ROUTE 13, between Afton Lane and Drew Valley Road
In the County of **DeKalb**
At Mile log: **2.41**



Report prepared by: Atkins
Name: Jimmy Adams, AICP
Title: Senior Transportation Planner
Address: 1600 River Edge Pkwy, NW, Suite 600, Atlanta, GA 30328

Telephone Number: (770) 933-0280
E-mail Address: jimmy.adams@atkinsglobal.com
FAX Number: (770) 933-1083

Date report prepared: March 2015

Location:

As illustrated on the cover sheet, the location for the proposed pedestrian hybrid beacon is along State Route 13 (Buford Highway) approximately 1,820 feet north of Afton Lane, in DeKalb County, GA. This area is characterized as predominately residential consisting of numerous multi-family dwelling units that generate a considerable amount of pedestrian traffic. The proposed pedestrian hybrid beacon would be located within close proximity to the driveway for the “Marquis Gardens Apartment Homes”. There are two MARTA bus stops that are also within walking distance of the proposed location that have a high transit ridership serving MARTA bus route 39.

Reason for the Investigation:

This pedestrian hybrid beacon is to be installed as part of a GDOT Project, P.I. No. 0009400. The “purpose of” and “need for” this GDOT transportation project is for pedestrian safety along Buford Highway, from Afton Lane to Shallowford Terrace. Currently, between Afton Lane and Shallowford Terrace, numerous pedestrians cross Buford Highway to access a variety of residential, retail and office establishments. The placement of a pedestrian hybrid beacon at this location will work to provide an additional safe location for pedestrians to cross Buford Highway.

Description of the Intersection:

Buford Highway is classified as a principal urban arterial at this location with an existing typical section that consists of six 11-foot travel lanes, three in each direction, with a continuous two-way center left-turn lane. A raised concrete median has been proposed at this location to serve as pedestrian refuge. The proposed mid-block pedestrian crossing would be located between two signalized intersections that are located approximately 1.20 miles apart; therefore, this mid-block crossing would serve those pedestrians traveling to and from the MARTA bus stops along each side of Buford Highway that serve the numerous multi-family apartment complexes located within the study area. Lighting conditions along this portion of Buford Highway consist of minimal street level lighting, and the existing sidewalks are not well maintained and are not continuous, as frequent large gaps in the sidewalk system occur within this project area; this becomes evident with “worn” footpaths along each side of Buford Highway.

Traffic Engineering Report
State Route 13 Mid-Block Pedestrian Crossing
Page 3 of 16

Traffic Volumes in Vehicles per Day (vpd):

Latest year percent trucks: Not Available

Latest year 24 hour percent trucks: Not Available

24-Hour Machine Tube Counts that were collected on March 25th, 2014 are provided as an attachment to this report.

Existing Traffic Control:

Buford Highway is not controlled at this proposed pedestrian hybrid beacon location.

Vehicular Speeds:

The posted speed limit along Buford Highway is 45 mph.

Pedestrian Movements:

- The east and west sides of Buford Highway at the proposed location mainly consists of multi-family dwelling units. Sidewalks along this portion of Buford Highway are not continuous.
- Pedestrian observations were conducted on December 4th, 2014, between the hours of 6:00 a.m. and 8:00 p.m. During this fourteen hour period, there was approximately 300 pedestrians observed crossing Buford Highway.

Other Modes of Transportation Present:

Transit bus service is provided by MARTA for pedestrians within this project corridor. Specifically, MARTA Bus Route #39 serves the Doraville Rail Station and the Lindbergh Rail Station along Buford Highway. Within the immediate vicinity of this proposed mid-block crossing location there are two MARTA bus stop locations serving bus route #39. One of these bus stop locations is for buses traveling southbound along Buford Highway, while the remaining location is for buses traveling northbound. Additional transit services can be reached at each of the rail stations through partner systems that have been established between the Georgia Regional Transportation Authority, Gwinnett County Transit, Cobb Community Transit and Clayton County Transit.

Delay:

No significant delays are expected to occur as a result of the placement of a pedestrian hybrid beacon at this location.

Parking:

No parking activity was observed or is expected to occur at the proposed location for the pedestrian hybrid beacon.

Accident History:

For the purposes of this analysis, accidents that occurred between Afton Lane and Shallowford Terrace were evaluated. Accidents were reviewed for the years 2003 to 2013. There have been a total of 1,608 collisions within the study corridor, 29 of which involved pedestrians. The pedestrian collisions resulted in 35 injuries and three fatalities. It is expected that additional protected pedestrian crossings within the study corridor would work to prevent the number of pedestrian collisions. The types of collisions within the study corridor are summarized in Table 1 and a collision diagram for the pedestrian accidents is provided as an attachment to this report. A detailed review of the accident data indicates that four of these pedestrian collisions were within the immediate vicinity of the proposed location for the pedestrian hybrid beacon. These collisions resulted in six injuries and one fatality.

Traffic Engineering Report
State Route 13 Mid-Block Pedestrian Crossing
Page 5 of 16

Table 1
Accident History

Year	Accidents								Injury	Fatal	Pedestrians Involved
	Rear- end	Side- swipe	Angle	Head- on	Struck Object	Run off	Other	Total			
2003	71	24	55	3			14	167	77	0	4
2004	62	20	40	6			7	135	74	1	4
2005	94	21	83	6			11	215	112	2	3
2006	74	20	55	5			14	168	62	0	4
2007	70	21	40	4			7	142	60	0	3
2008	57	24	42	8			12	143	59	0	2
2009	35	18	43	7			5	108	50	0	3
2010	28	16	42	3			7	96	41	2	2
2011	56	19	43	6			12	136	71	2	1
2012	43	15	39	7			7	111	33	0	1
2013	43	27	99	5			13	187	46	0	2
Totals:	633	225	581	60			109	1608	685	7	29

*Pedestrians include bicycle and pedestrian traffic.

Adjacent Signalized Intersections:

There is a traffic signal located at the intersection of Buford Highway @ Briarwood Road, approximately 3,520 feet south of the subject location. There is an additional traffic signal located at the intersection of Buford Highway @ Clairmont Terrace, approximately 2,615 feet north of the subject location.

Warrant Analysis:

Guidelines used to justify the placement of a pedestrian hybrid beacon were taken from the Manual on Uniform Traffic Control Devices (MUTCD) 2009 edition, Chapter 4F. A pedestrian hybrid beacon may be considered for installation to facilitate pedestrian crossings at locations that do not meet traffic signal warrants. Criteria from the MUTCD, 2009 edition for roadway facilities that operate in excess of 35 mph were utilized for this analysis. The need for a pedestrian hybrid beacon should be considered when the number of vehicles per hour (total of both approaches) and the corresponding total of all pedestrians crossing the major street for a one hour period (any four consecutive 15-minute periods) exceed the plotted curve on Figure 4F-2 that represents the length of the subject crosswalk. The placement of a pedestrian hybrid beacon should consider the major street volumes, speeds, widths and gaps in conjunction with pedestrian volumes, walking speeds and delay.

In order to evaluate the proposed location for the placement of a pedestrian hybrid beacon, typical weekday pedestrian activity between the hours of 6:00 AM and 8:00 PM were observed on December 4th, 2014. Corresponding traffic data was also collected for the proposed pedestrian hybrid beacon on March 25th, 2014. These data are illustrated in Table 2 and have revealed that during a typical weekday nearly 300 pedestrians cross Buford Highway. These pedestrian crossings were evaluated for one-hour periods using any four consecutive 15-minute time periods available. These data have indicated that a pedestrian hybrid beacon would be justified at the proposed location because the number of pedestrians per hour repeatedly exceeds the lower threshold volume of twenty (20) pedestrians per hour. The time periods that comprehensively satisfy the conditions for a pedestrian hybrid beacon are summarized in Table 3. The results of this analysis are illustrated on Figure 1.

Table 2
Hourly Pedestrian Movements (Location #2)
Vicinity of Vale North Condominiums and Royale Apartments

Time	Vehicles Per Hour	Pedestrians Per Hour
6:00-7:00 AM	560	25
7:00-8:00 AM	1,319	31
8:00-9:00 AM	1,673	20
9:00-10:00 AM	1,240	22
10:00-11:00 AM	1,039	10
11:00-12:00 PM	1,299	8
12:00-1:00 PM	1,661	10
1:00-2:00 PM	1,560	19
2:00-3:00 PM	1,496	29
3:00-4:00 PM	1,674	21
4:00-5:00 PM	1,931	37
5:00-6:00 PM	2,277	32
6:00-7:00 PM	2,001	7
7:00-8:00 PM	1,642	23

*This table reflects the counts that were conducted in the vicinity of Valley North Condominiums and Royale Apartments along SR 13.

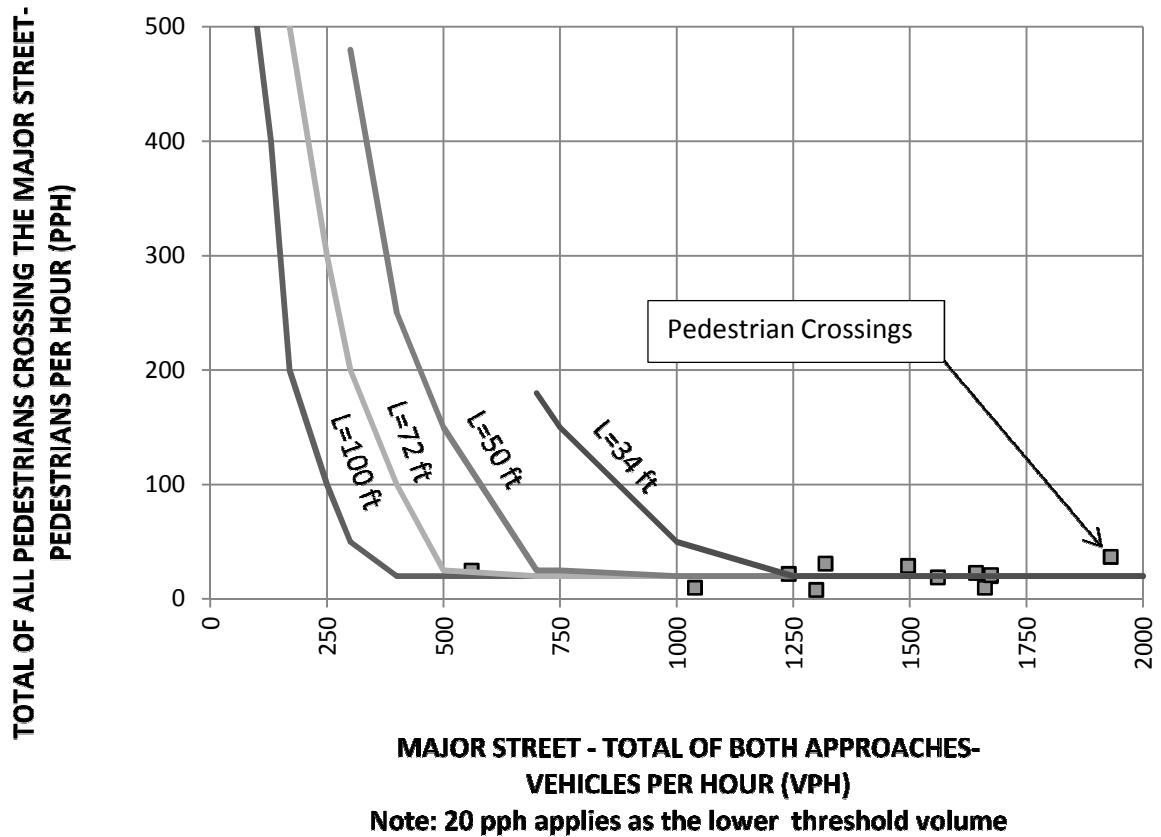
Traffic Engineering Report
State Route 13 Mid-Block Pedestrian Crossing
Page 8 of 16

Table 3
Warranted Conditions (Location #2)
Vicinity of Vale North Condominiums and Royale Apartments

Baseline for 72 ft (4F-2)		TIME	VPH (SR 13)	PPH (SR 13)	CONDITION
VPH	PPH				
500	25	6:00-7:00 AM	560	25	MET
500	25	6:15-7:15 AM	670	26	MET
750	20	6:30-7:30 AM	844	24	MET
1000	20	6:45-7:45 AM	1056	29	MET
1250	20	7:00-8:00 AM	1319	31	MET
1500	20	7:15-8:15 AM	1537	32	MET
1500	20	7:30-8:30 AM	1669	28	MET
1500	20	7:45-8:45 AM	1737	23	MET
1500	20	8:00-9:00 AM	1673	20	MET
1250	20	8:30-9:30 AM	1385	24	MET
1250	20	8:45-9:45 AM	1294	20	MET
1000	20	9:00-10:00 AM	1240	22	MET
1250	20	1:15-2:15 PM	1468	22	MET
1250	20	1:30-2:30 PM	1459	27	MET
1250	20	1:45-2:45 PM	1401	26	MET
1250	20	2:00-3:00 PM	1496	29	MET
1500	20	2:15-3:15 PM	1540	25	MET
1500	20	2:30-3:30 PM	1592	23	MET
1500	20	3:45-4:45 PM	1704	20	MET
1500	20	3:00-4:00 PM	1674	21	MET
1500	20	3:15-4:15 PM	1749	26	MET
1750	20	3:30-4:30 PM	1786	34	MET
1750	20	3:45-4:45 PM	1874	40	MET
1750	20	4:00-5:00 PM	1931	37	MET
2000	20	4:15-5:15 PM	2034	41	MET
2000	20	4:30-5:30 PM	2155	37	MET
2000	20	4:45-5:45 PM	2206	36	MET
2000	20	5:00-6:00 PM	2277	32	MET
2000	20	5:15-6:15 PM	2248	24	MET
1500	20	7:00-8:00 PM	1642	23	MET

*This table illustrates the hours met from the conducted counts.

Figure 1
Guidelines for the Installation of Pedestrian Hybrid Beacons on High-Speed Roadways



Roundabout

As per GDOT Policy 4A-2, this portion of Buford Highway has been considered to determine if a roundabout will perform acceptably at a minor street approach within close proximity to the proposed pedestrian hybrid beacon. The analysis indicates that the proposed location is situated within close proximity to the driveway for the “Marquis Gardens Apartment Homes”; however, the traffic volumes at this location are anticipated to remain too low for the placement of a traffic signal. Additionally, it would be expected that the percent of traffic on State Route 13 would exceed 90 percent of the total traffic entering the intersection within close proximity to the proposed pedestrian hybrid beacon. Therefore, it was determined that a roundabout at this location would not be appropriate or operate acceptably at any nearby intersection.

Recommendations:

A number of issues that included residential and non-residential land uses, transit ridership and observed pedestrian crossings worked to establish the location of this proposed pedestrian hybrid beacon. The area to be served by this pedestrian hybrid beacon experiences a high volume of pedestrian activity due to the presence of large multi-family complexes to the east and west of Buford Highway and the non-residential destinations between the traffic signals along Buford Highway at Briarwood Road and Clairmont Terrace. The proposed location may also work to reverse the history of pedestrian accidents, injuries and deaths within the corridor.

In order to maximize the utilization of the proposed pedestrian hybrid beacon, the location was selected at a location where a high number of pedestrians were observed crossing Buford Highway. The proposed pedestrian hybrid beacon is approximately 1,820 feet north of Afton Lane and approximately 2,615 feet south of the nearest signalized intersection along Buford Highway at Clairmont Terrace.

The location of the proposed pedestrian hybrid beacon does not meet the guidance provided in section 4F.02.04.A of the MUTCD, 2009 edition: “The pedestrian hybrid beacon should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs”. There are numerous driveways within close proximity to the proposed location of the pedestrian hybrid beacon; therefore, due to the number of existing driveways, it was not possible to meet the guidance for a 100’ offset from driveways. It is recommended that the proposed location remain as proposed even though this location is not in accordance with the suggested 100-foot guidance. Furthermore, it is recommended that a signal permit be issued for the installation of a pedestrian hybrid beacon along Buford Highway, approximately 1,820 feet north of Afton Lane. Criteria from the MUTCD, 2009 edition, chapter 4F, for roadway facilities that operate in excess of 35 mph were satisfied for this analysis.

Traffic Engineering Report
State Route 13 Mid-Block Pedestrian Crossing
Page 11 of 16

RECOMMENDED BY: _____
District Traffic Engineer

DATE: _____

RECOMMENDED BY: _____
State Traffic Engineer

DATE: _____

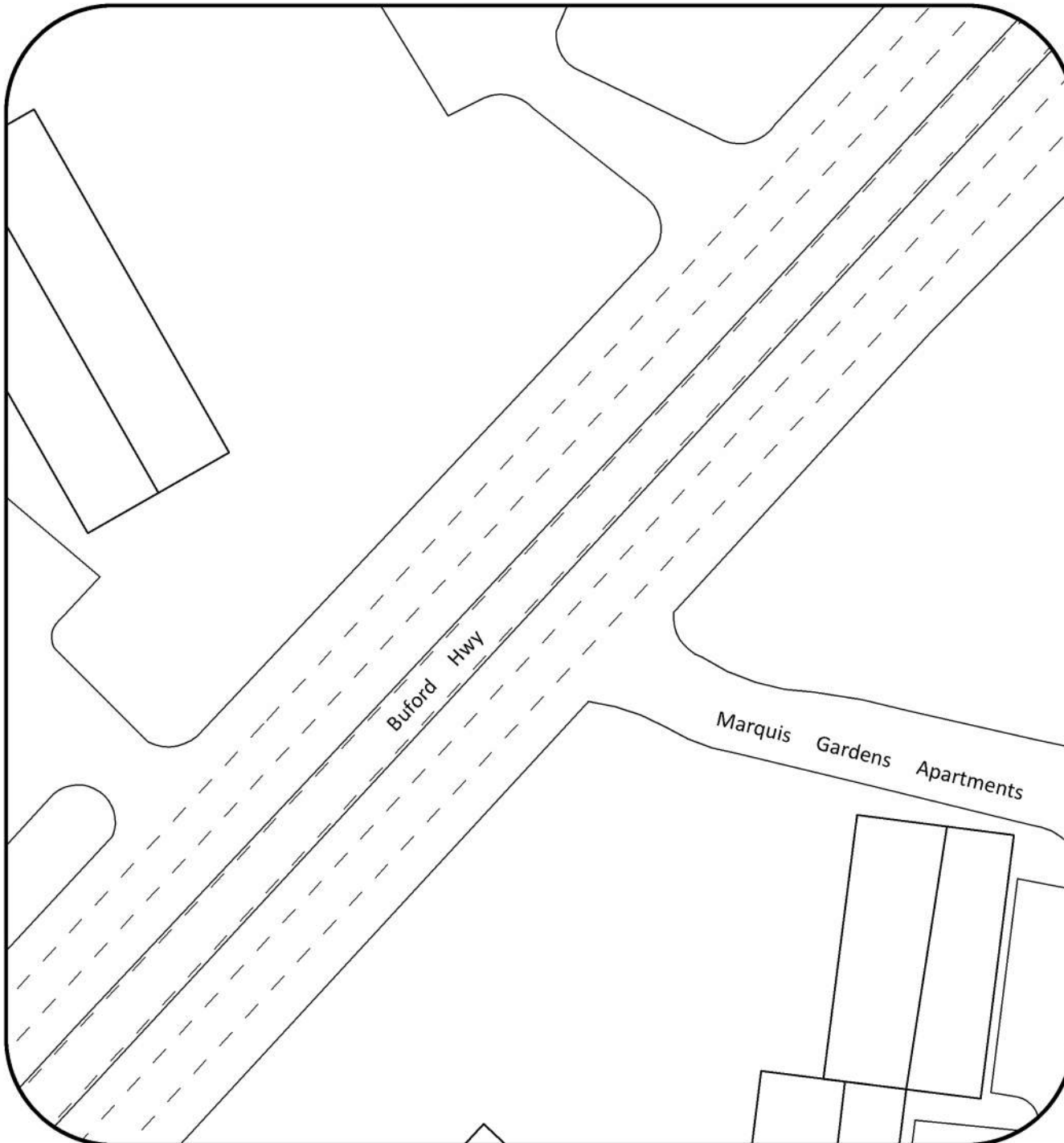
APPROVED BY: _____
Director of Operations

DATE: _____

Traffic Engineering Report
State Route 13 Mid-Block Pedestrian Crossing
Page 12 of 16

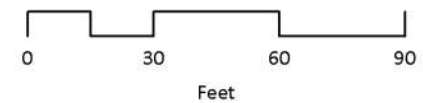
Traffic Engineering Report Appendix

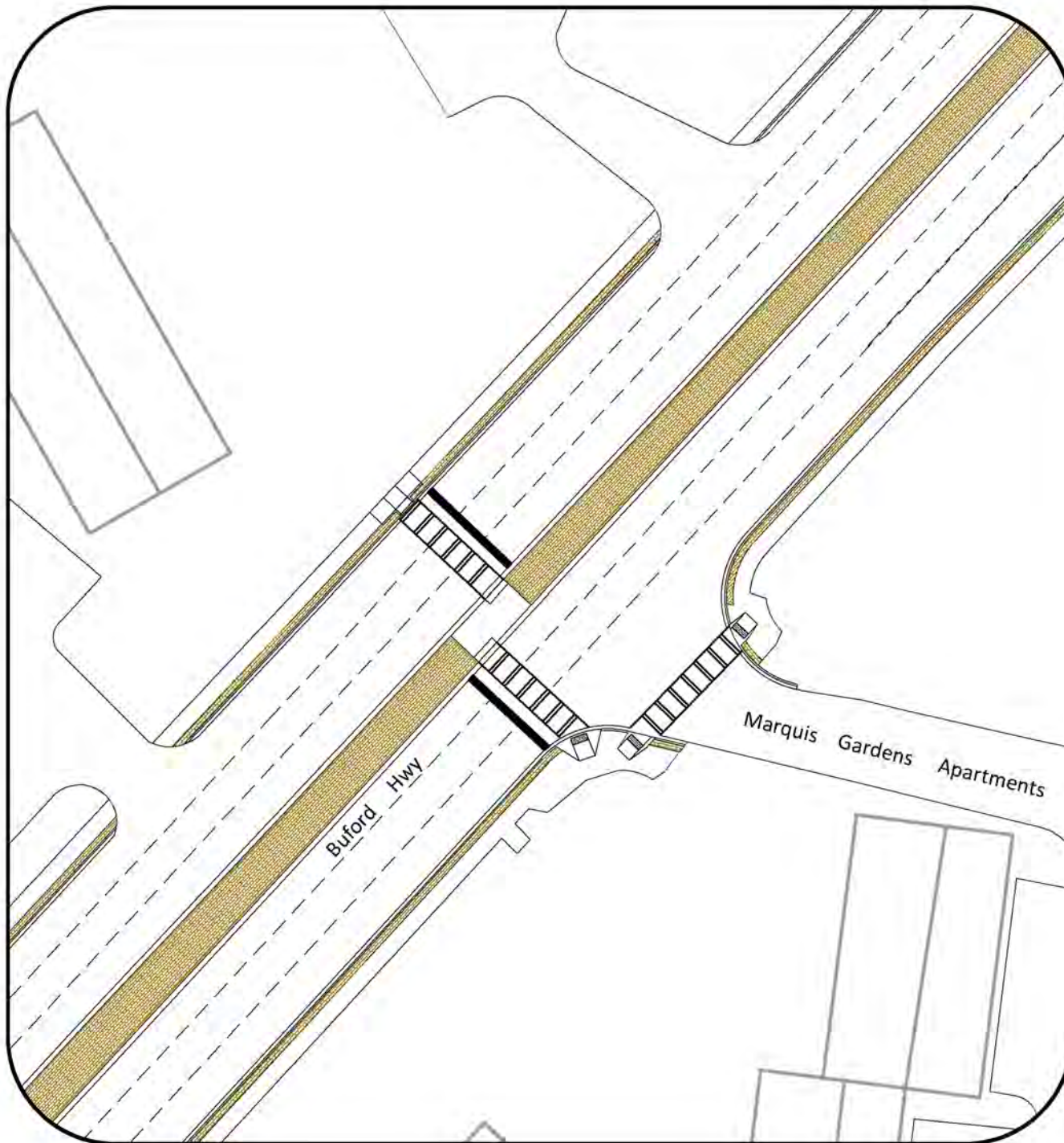
- Sketch of the present intersection.
- Sketch of the proposed intersection.
- Traffic Count Summary Sheets.
- Collision Diagram.



Buford Hwy Pedestrian Safety Project
P.I. #0009400
DeKalb County, Georgia
SR 13, from Afton Ln to Shallowford Ter, Phase II

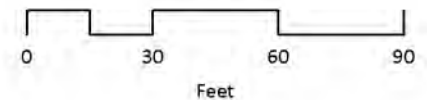
Existing Conditions





Buford Hwy Pedestrian Safety Project
P.I. #0009400
DeKalb County, Georgia
SR 13, from Afton Ln to Shallowford Ter, Phase II

Build Conditions



Atkins

Twenty-Four Hour Traffic Count

Location: Buford Hwy, north of Highland Knolls and south of Drew Valley Rd

Hour Ending	1st		2nd		3rd		4th		Total		TOTAL
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound	
1:00 AM	35	68	35	42	38	38	24	21	132	169	301
2:00 AM	16	21	23	25	19	11	10	12	68	69	137
3:00 AM	13	17	10	18	16	13	15	12	54	60	114
4:00 AM	15	17	22	15	26	16	24	9	87	57	144
5:00 AM	32	18	76	14	47	22	27	15	182	69	251
6:00 AM	26	13	28	24	36	17	63	32	153	86	239
7:00 AM	63	42	68	65	80	72	77	93	288	272	560
8:00 AM	97	118	134	173	149	215	156	277	536	783	1,319
9:00 AM	141	292	135	304	146	286	126	243	548	1,125	1,673
10:00 AM	119	191	95	179	145	196	138	177	497	743	1,240
11:00 AM	123	152	121	147	125	113	127	131	496	543	1,039
12:00 PM	129	135	173	169	188	168	180	157	670	629	1,299
1:00 PM	187	171	197	227	215	216	212	236	811	850	1,661
2:00 PM	230	197	192	215	197	172	194	163	813	747	1,560
3:00 PM	163	172	204	194	109	202	261	191	737	759	1,496
4:00 PM	199	180	229	221	226	197	226	196	880	794	1,674
5:00 PM	238	216	273	214	284	227	274	205	1,069	862	1,931
6:00 PM	306	251	368	240	313	249	298	252	1,285	992	2,277
7:00 PM	313	215	296	235	234	222	250	236	1,093	908	2,001
8:00 PM	235	230	211	186	182	204	192	202	820	822	1,642
9:00 PM	196	145	152	174	168	143	147	130	663	592	1,255
10:00 PM	114	124	105	123	91	97	69	87	379	431	810
11:00 PM	88	91	95	92	92	63	83	71	358	317	675
12:00 AM	58	46	57	55	37	36	32	45	184	182	366
Total	3,136	3,122	3,299	3,351	3,163	3,195	3,205	3,193	12,803	12,861	25,664

Twenty-Four Hour Volume: **25,664** Vehicles Per Day

A.M. Peak Hour Is From **7:45 AM** TO **8:45 AM**
 Volume of **1,737** Is **6.8%** Of 24-Hour Volume

P.M. Peak Hour Is From **5:00 PM** TO **6:00 PM**
 Volume of **2,277** Is **8.9%** Of 24-Hour Volume

	% Northbound	% Southbound
AM Directional Distribution	33%	67%
PM Directional Distribution	56%	44%

Machine Count Made By: *Southern Traffic Services*

Day-of-Week of Count: *Tuesday*

Date of Count: *25-Mar-14*

Report Prepared By: *JRA*

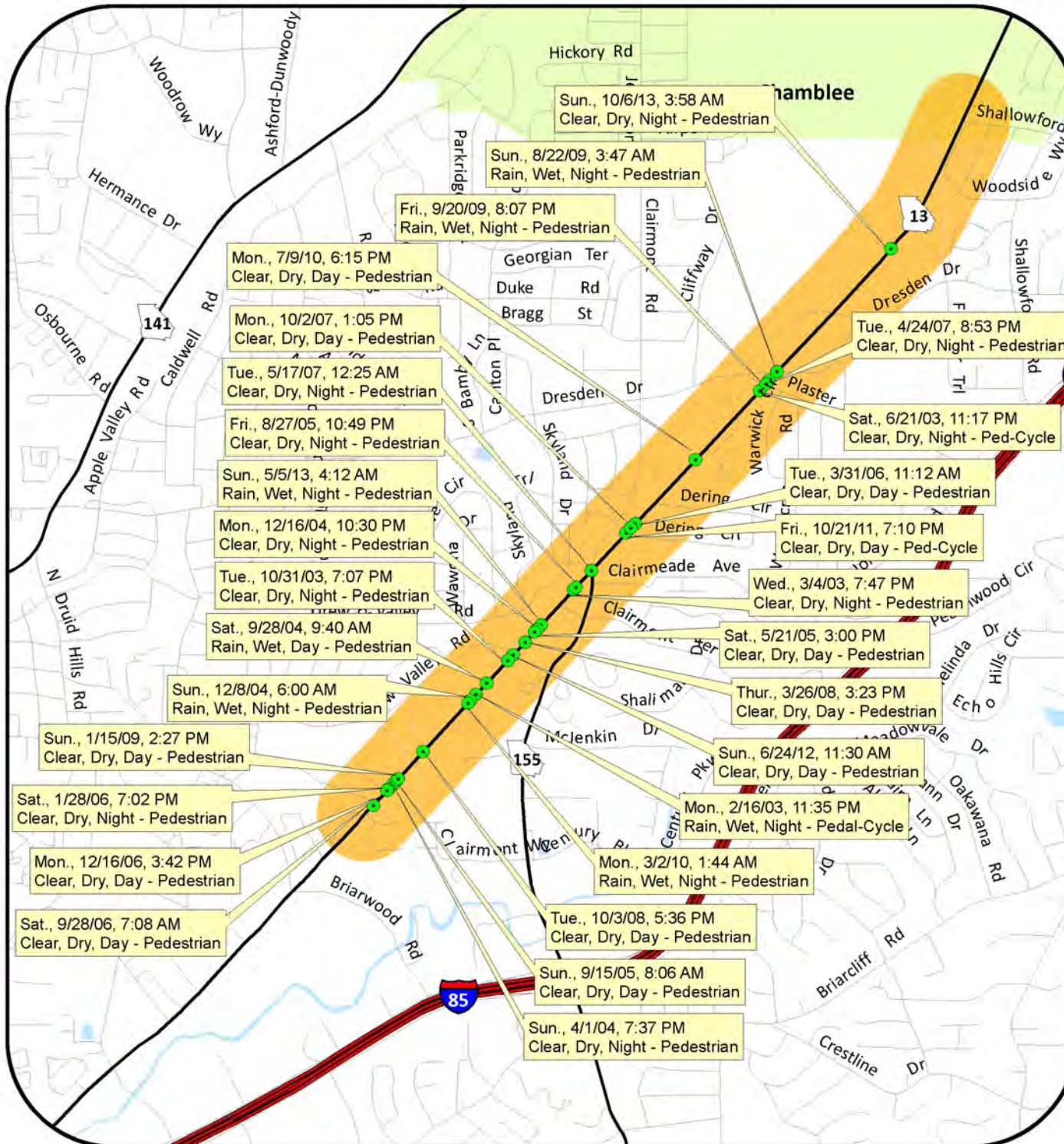
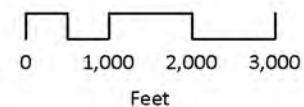
Date Report Prepared: *16-Dec-14*

Buford Hwy Pedestrian Safety Project
P.I. #0009400
DeKalb County, Georgia
SR 13, from Afton Ln to Shallowford Ter, Phase II

Accident Diagram
Pedestrian Collision Locations

Legend

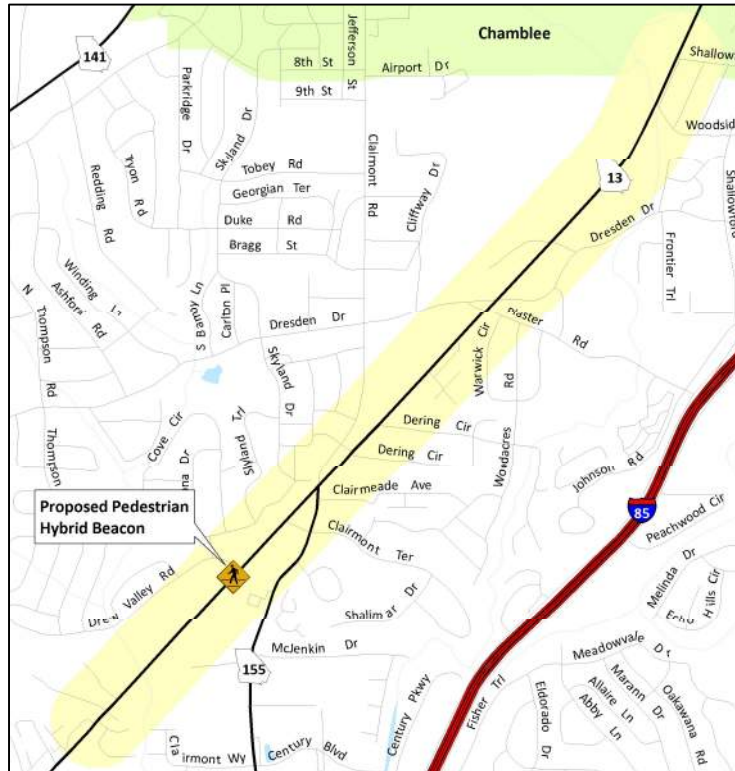
-  Bicycle/Pedestrian Collisions
-  Study Area
-  Interstate
-  State Highway
-  Local Roadway
-  Ramp
-  Lake/Pond
-  Stream



DEPARTMENT OF TRANSPORTATION STATE
OF GEORGIA

TRAFFIC ENGINEERING REPORT

For the intersection of:
STATE ROUTE 13, south of Drew Valley Road
In the County of **DeKalb**
At Mile log: **2.66**



Report prepared by: Atkins
Name: Jimmy Adams, AICP
Title: Senior Transportation Planner
Address: 1600 River Edge Pkwy, NW, Suite 600, Atlanta, GA 30328

Telephone Number: (770) 933-0280
E-mail Address: jimmy.adams@atkinsglobal.com
FAX Number: (770) 933-1083

Date report prepared: March 2015

Location:

As illustrated on the cover sheet, the location for the proposed pedestrian hybrid beacon is along State Route 13 (Buford Highway) approximately 175 feet south of Drew Valley Road, in DeKalb County, GA. Currently, at this location, there are mixtures of land uses that generate pedestrian traffic, along with two MARTA bus stops that are also within the immediate vicinity of the proposed location that have a high transit ridership serving MARTA bus route 39.

Reason for the Investigation:

This pedestrian hybrid beacon is to be installed as part of a GDOT Project, P.I. No. 0009400. The “purpose of” and “need for” this GDOT transportation project is for pedestrian safety along Buford Highway, from Afton Lane to Shallowford Terrace. Currently, between Afton Lane and Shallowford Terrace, numerous pedestrians cross Buford Highway to access a variety of residential, retail and office establishments. The placement of a pedestrian hybrid beacon at this location will work to provide an additional safe location for pedestrians to cross Buford Highway.

Description of the Intersection:

Buford Highway is classified as a principal urban arterial at this location with an existing typical section that consists of six 11-foot travel lanes, three in each direction, with a continuous two-way center left-turn lane. A raised concrete median has been proposed at this location to serve as pedestrian refuge. The proposed mid-block pedestrian crossing would be located between two signalized intersections that are located approximately 1.20 miles apart; therefore, this mid-block crossing would serve those pedestrians traveling to and from the MARTA bus stops along each side of Buford Highway that serve the numerous residential and non-residential land uses located within the study area. Lighting conditions along this portion of Buford Highway consist of minimal street level lighting, and the existing sidewalks are not well maintained and are not continuous, as frequent large gaps in the sidewalk system occur within this project area; this becomes evident with “worn” footpaths along each side of Buford Highway.

Traffic Engineering Report
State Route 13 Mid-Block Pedestrian Crossing
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Traffic Volumes in Vehicles per Day (vpd):

Latest year percent trucks: Not Available

Latest year 24 hour percent trucks: Not Available

24-Hour Machine Tube Counts that were collected on March 25th, 2014 are provided as an attachment to this report.

Existing Traffic Control:

Buford Highway is not controlled at this proposed pedestrian hybrid beacon location.

Vehicular Speeds:

The posted speed limit along Buford Highway is 45 mph.

Pedestrian Movements:

- The west side of Buford Highway at the proposed location mainly consists of multi-family dwelling units. Sidewalks along this portion of Buford Highway are not continuous.
- The east side of Buford Highway at the proposed location consists of both residential and non-residential land uses. Specifically, there are entertainment and service establishments that generate pedestrian activity.
- Pedestrian observations were conducted on December 4th, 2014, between the hours of 6:00 a.m. and 8:00 p.m. During this fourteen hour period, there were 52 pedestrians observed crossing Buford Highway.

Other Modes of Transportation Present:

Transit bus service is provided by MARTA for pedestrians within this project corridor. Specifically, MARTA Bus Route #39 serves the Doraville Rail Station and the Lindbergh Rail Station along Buford Highway. Within the immediate vicinity of this proposed mid-block crossing location there are two MARTA bus stop locations serving bus route #39. One of these bus stop locations is for buses traveling southbound along Buford Highway, while the remaining location is for buses traveling northbound. Additional transit services can be reached at each of the rail stations through partner systems that have been established between the Georgia Regional Transportation Authority, Gwinnett County Transit, Cobb Community Transit and Clayton County Transit.

Delay:

No significant delays are expected to occur as a result of the placement of a pedestrian hybrid beacon at this location.

Parking:

No parking activity was observed or is expected to occur at the proposed location for the pedestrian hybrid beacon.

Accident History:

For the purposes of this analysis, accidents that occurred between Afton Lane and Shallowford Terrace were evaluated. Accidents were reviewed for the years 2003 to 2013. There have been a total of 1,608 collisions within the study corridor, 29 of which involved pedestrians. The pedestrian collisions resulted in 35 injuries and three fatalities. It is expected that additional protected pedestrian crossings within the study corridor would work to prevent the number of pedestrian collisions. The types of collisions within the study corridor are summarized in Table 1 and a collision diagram for the pedestrian accidents is provided as an attachment to this report. A detailed review of the accident data indicates that eight of these pedestrian collisions were within the immediate vicinity of the proposed location for the pedestrian hybrid beacon. These collisions resulted in eleven injuries and two fatalities.

Traffic Engineering Report
State Route 13 Mid-Block Pedestrian Crossing
Page 5 of 15

Table 1
Accident History

Year	Accidents								Injury	Fatal	Pedestrians Involved
	Rear- end	Side- swipe	Angle	Head- on	Struck Object	Run off	Other	Total			
2003	71	24	55	3			14	167	77	0	4
2004	62	20	40	6			7	135	74	1	4
2005	94	21	83	6			11	215	112	2	3
2006	74	20	55	5			14	168	62	0	4
2007	70	21	40	4			7	142	60	0	3
2008	57	24	42	8			12	143	59	0	2
2009	35	18	43	7			5	108	50	0	3
2010	28	16	42	3			7	96	41	2	2
2011	56	19	43	6			12	136	71	2	1
2012	43	15	39	7			7	111	33	0	1
2013	43	27	99	5			13	187	46	0	2
Totals:	633	225	581	60			109	1608	685	7	29

*Pedestrians include bicycle and pedestrian traffic.

Adjacent Signalized Intersections:

There is a traffic signal located at the intersection of Buford Highway @ Briarwood Road, approximately 4,850 feet south of the subject location. There is an additional signal located at the intersection of Buford Highway @ Clairmont Terrace, approximately 1,265 feet north of the subject location.

Warrant Analysis:

Guidelines used to justify the placement of a pedestrian hybrid beacon were taken from the Manual on Uniform Traffic Control Devices (MUTCD) 2009 edition, Chapter 4F. A pedestrian hybrid beacon may be considered for installation to facilitate pedestrian crossings at locations that do not meet traffic signal warrants. Criteria from the MUTCD, 2009 edition for roadway facilities that operate in excess of 35 mph were utilized for this analysis. The need for a pedestrian hybrid beacon should be considered when the number of vehicles per hour (total of both approaches) and the corresponding total of all pedestrians crossing the major street for a one hour period (any four consecutive 15-minute periods) exceed the plotted curve on Figure 4F-2 that represents the length of the subject crosswalk. The placement of a pedestrian hybrid beacon should consider the major street volumes, speeds, widths and gaps in conjunction with pedestrian volumes, walking speeds and delay.

In order to evaluate the proposed location for the placement of a pedestrian hybrid beacon, typical weekday pedestrian activity between the hours of 6:00 AM and 8:00 PM were observed on December 4th, 2014. Corresponding traffic data was also collected for the proposed pedestrian hybrid beacon on March 25th, 2014. These data are illustrated in Table 2 and have revealed that during a typical weekday approximately 50 pedestrians cross Buford Highway at the proposed location. These pedestrian crossings were evaluated for one-hour periods using any four consecutive 15-minute time periods available. These data have indicated that a pedestrian hybrid beacon would not be justified at the proposed location because the number of pedestrians per hour does not exceed the lower threshold volume of twenty (20) pedestrians per hour. There were not any time periods that satisfy the conditions for a pedestrian hybrid beacon, which has been summarized in Table 3. The results of this analysis are illustrated on Figure 1.

Table 2
Hourly Pedestrian Movements (Location #3)
Vicinity of Drew Valley Road and Druid Towne Apartments

Time	Vehicles Per Hour	Pedestrians Per Hour
6:00-7:00 AM	558	0
7:00-8:00 AM	1,311	2
8:00-9:00 AM	1,665	1
9:00-10:00 AM	1,225	1
10:00-11:00 AM	1,058	7
11:00-12:00 PM	1,308	4
12:00-1:00 PM	1,652	3
1:00-2:00 PM	1,554	3
2:00-3:00 PM	1,530	4
3:00-4:00 PM	1,656	1
4:00-5:00 PM	1,950	4
5:00-6:00 PM	2,318	13
6:00-7:00 PM	2,014	6
7:00-8:00 PM	1,608	3

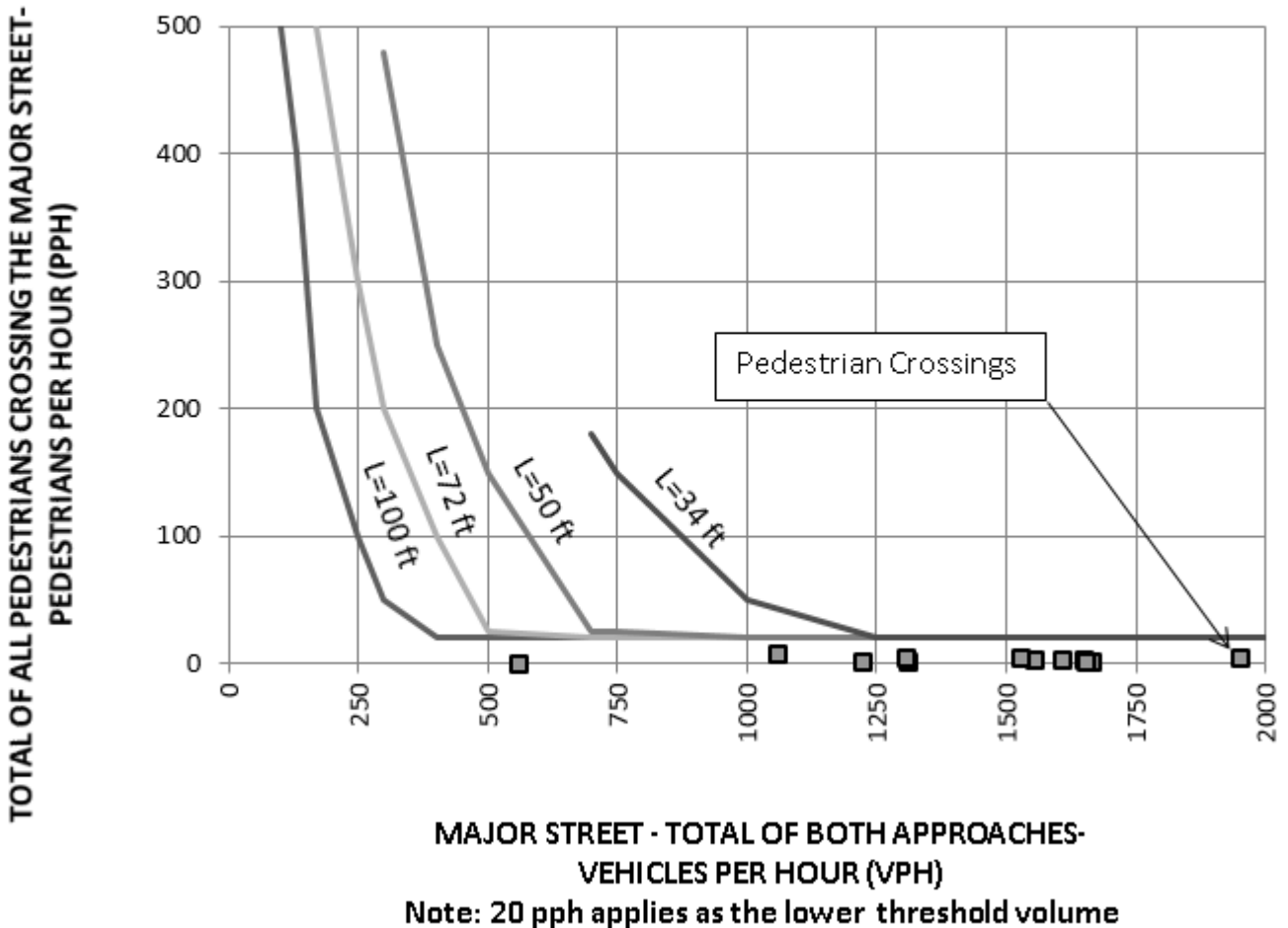
*This table reflects the counts that were conducted in the vicinity of Drew Valley Road and Druid Towne Apartments along SR 13.

Table 3
Warranted Conditions (Location #3)
Vicinity of Drew Valley Road and Druid Towne Apartments

Baseline for 72 ft (4F-2)		TIME	VPH (SR 13)	PPH (SR 13)	CONDITION
VPH	PPH				
n/a	n/a	n/a	n/a	n/a	NONE MET

*This table illustrates the hours met from the conducted counts.

Figure 1
Guidelines for the Installation of Pedestrian Hybrid Beacons on High-Speed Roadways



Roundabout

As per GDOT Policy 4A-2, this portion of Buford Highway has been considered to determine if a roundabout will perform acceptably at a minor street approach within close proximity to the proposed pedestrian hybrid beacon. The analysis indicates that the proposed location is situated within close proximity to a non-residential driveway and to Drew Valley Road; however, the traffic volumes at these locations are anticipated to remain too low for the placement of a traffic signal. Additionally, it would be expected that the percent of traffic on State Route 13 would exceed 90 percent of the total traffic entering the intersection within close proximity to the proposed pedestrian hybrid beacon. Therefore, it was determined that a roundabout at this location would not be appropriate or operate acceptably at any nearby intersection.

Recommendations:

A number of issues that included residential and non-residential land uses, transit ridership and observed pedestrian crossings worked to establish the location of this proposed pedestrian hybrid beacon. Even though the area to be served by this pedestrian hybrid beacon does not meet the guidelines used to justify the placement of a pedestrian hybrid beacon, pedestrian activity was observed at this location that resulted in over 50 pedestrians crossing Buford Highway between the hours of 6:00 AM and 8:00 PM. Additionally, there have been two pedestrian fatalities within close proximity to the proposed location that occurred along Buford Highway approximately 1,450 feet north of Drew Valley Road and approximately 2,800 feet south of Drew Valley Road. These pedestrian fatalities occurred on August 27th, 2005 and April 1st, 2004, respectively. Based upon vehicular speeds, major-street traffic volumes, the width of the roadway and adequate gaps in traffic, pedestrians may find it difficult to safely cross Buford Highway at this location.¹ It is recommended that this location be considered for the placement of a pedestrian hybrid beacon to provide for an additional safe location for pedestrians to cross. There are a number of residential and non-residential land uses to the east and west of Buford Highway at the proposed location that would benefit from this pedestrian amenity. The proposed pedestrian hybrid beacon is proposed to be situated approximately 3,490 feet north of Afton Lane and approximately 1,265 feet south of the nearest signalized intersection along Buford Highway at Clairmont Terrace.

The location of the proposed pedestrian hybrid beacon does not meet the guidance provided in section 4F.02.04.A of the MUTCD, 2009 edition: “The pedestrian hybrid beacon should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs”. There are numerous driveways within close proximity to the proposed location of the pedestrian hybrid beacon; therefore, due to the number of existing driveways, it was not possible to meet the guidance for a 100’ offset from driveways.

It is recommended that a signal permit be issued for the installation of a pedestrian hybrid beacon along Buford Highway, approximately 3,490 feet north of Afton Lane. Criteria from the MUTCD, 2009 edition, chapter 4F, for roadway facilities that operate in excess of 35 mph were not satisfied for this analysis; however, pedestrian activity and fatalities were observed at this location. The placement of a pedestrian hybrid beacon at this location would improve pedestrian safety along Buford Highway.

¹ MUTCD, 2009 Edition, Chapter 4F, Section 4F.01.05, p. 509.

Traffic Engineering Report
State Route 13 Mid-Block Pedestrian Crossing
Page 10 of 15

RECOMMENDED BY: _____
District Traffic Engineer

DATE: _____

RECOMMENDED BY: _____
State Traffic Engineer

DATE: _____

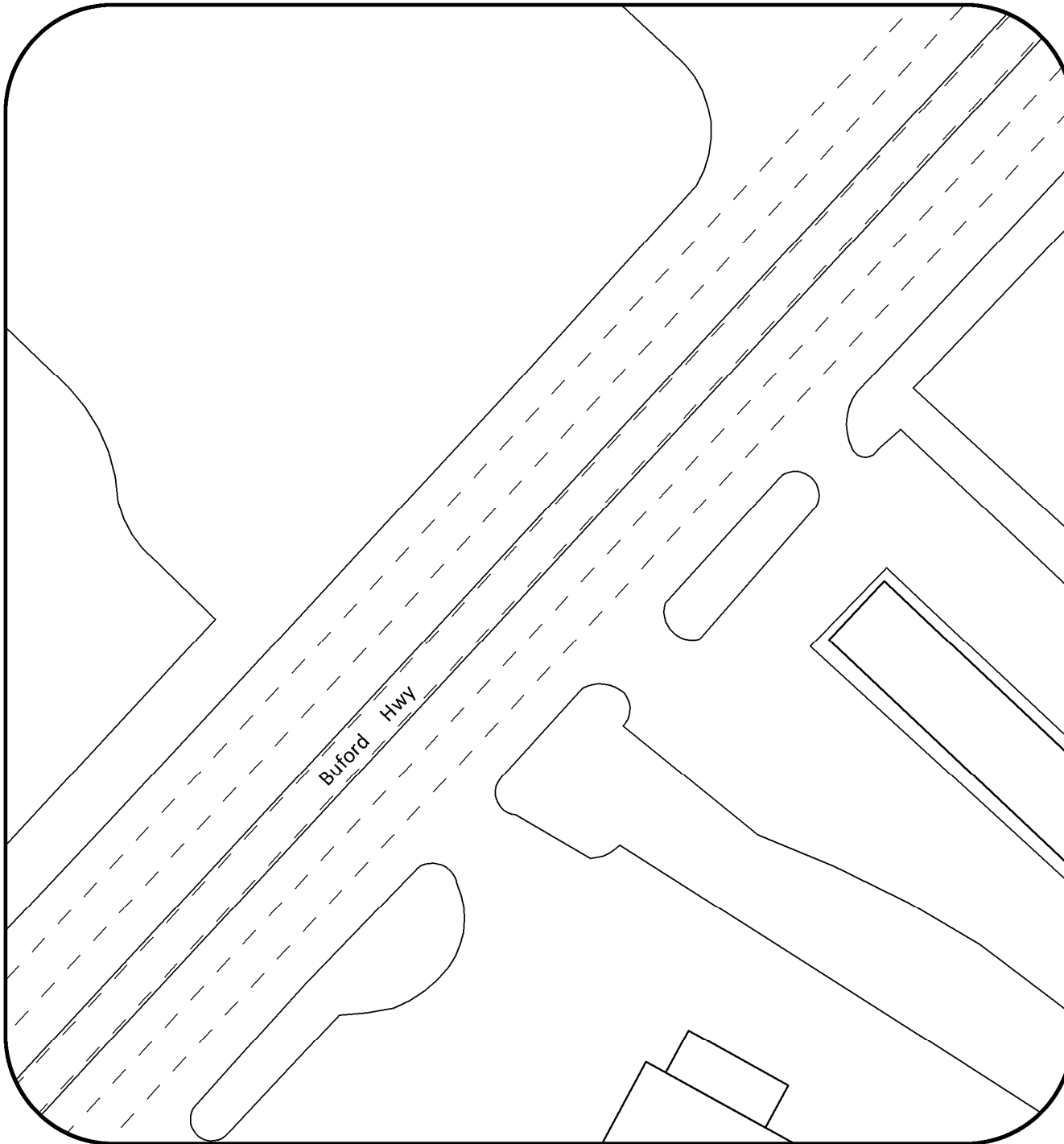
APPROVED BY: _____
Director of Operations

DATE: _____

Traffic Engineering Report
State Route 13 Mid-Block Pedestrian Crossing
Page 11 of 15

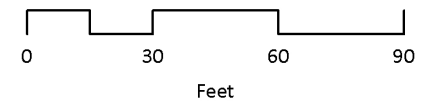
Traffic Engineering Report Appendix

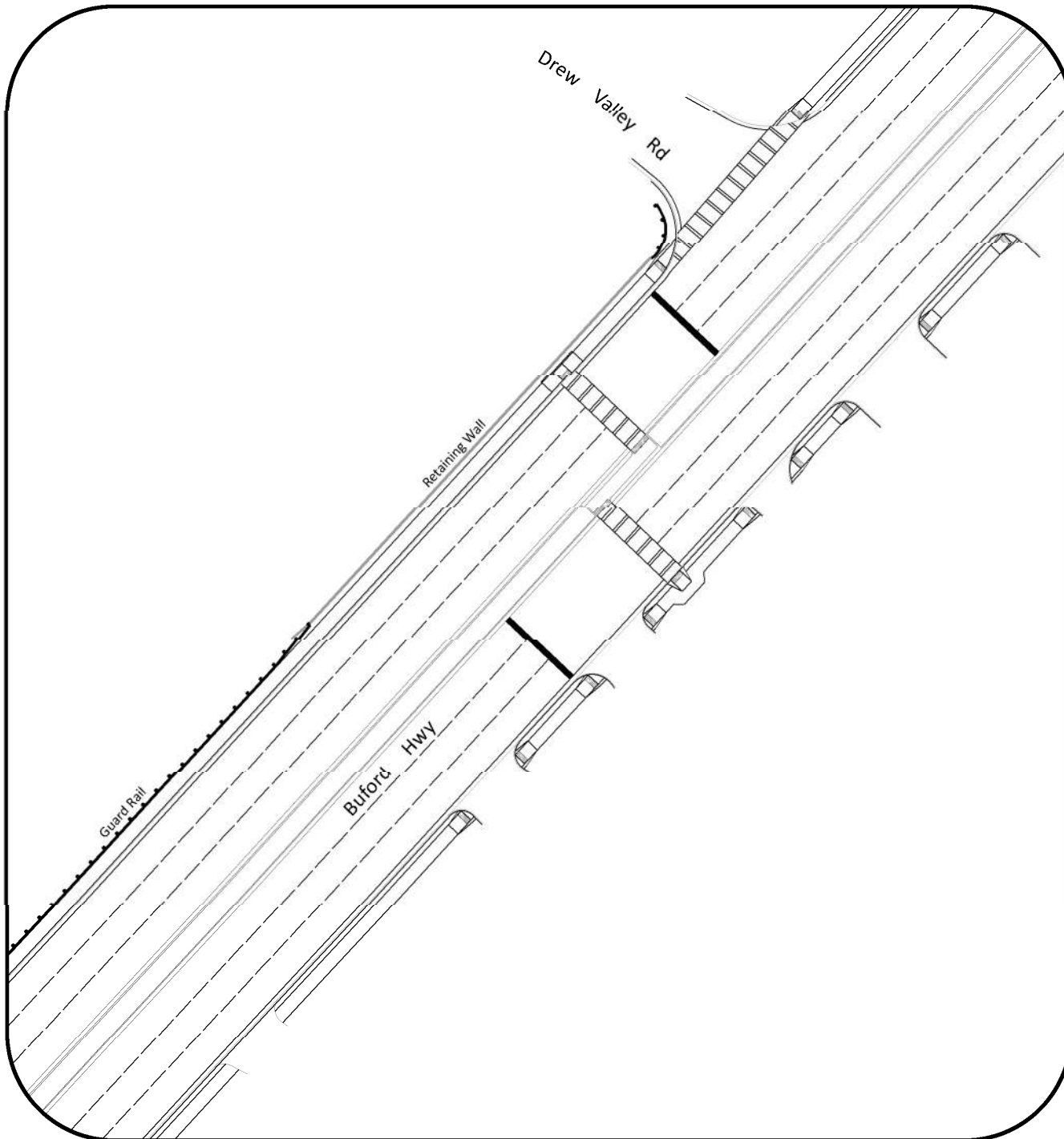
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Buford Hwy Pedestrian Safety Project
P.I. #0009400
DeKalb County, Georgia
SR 13, from Afton Ln to Shallowford Ter, Phase II

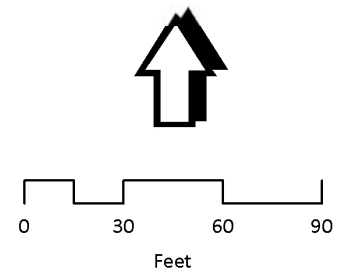
Existing Conditions





Buford Hwy Pedestrian Safety Project
P.I. #0009400
DeKalb County, Georgia
SR 13, from Afton Ln to Shallowford Ter, Phase II

Build Conditions



Atkins

Twenty-Four Hour Traffic Count

Location: Buford Hwy, just south of Drew Valley Rd

Hour Ending	1st		2nd		3rd		4th		Total		TOTAL
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound	
1:00 AM	36	72	35	38	38	36	24	22	133	168	301
2:00 AM	16	20	24	26	20	11	10	12	70	69	139
3:00 AM	16	17	11	16	15	13	16	12	58	58	116
4:00 AM	15	13	22	14	27	15	23	9	87	51	138
5:00 AM	33	18	80	13	48	22	29	15	190	68	258
6:00 AM	28	13	28	30	36	14	64	32	156	89	245
7:00 AM	62	42	70	65	80	68	78	93	290	268	558
8:00 AM	98	120	134	171	151	204	167	266	550	761	1,311
9:00 AM	142	279	139	304	145	281	129	246	555	1,110	1,665
10:00 AM	123	194	102	175	143	184	136	168	504	721	1,225
11:00 AM	129	148	125	142	130	116	137	131	521	537	1,058
12:00 PM	133	135	176	160	199	165	187	153	695	613	1,308
1:00 PM	196	167	205	211	218	207	224	224	843	809	1,652
2:00 PM	232	191	196	205	202	172	199	157	829	725	1,554
3:00 PM	175	179	207	191	113	207	266	192	761	769	1,530
4:00 PM	201	169	234	213	234	191	224	190	893	763	1,656
5:00 PM	244	221	275	207	296	219	281	207	1,096	854	1,950
6:00 PM	310	251	377	234	327	253	314	252	1,328	990	2,318
7:00 PM	323	223	312	219	237	222	254	224	1,126	888	2,014
8:00 PM	237	220	215	178	189	192	182	195	823	785	1,608
9:00 PM	194	144	154	171	169	146	154	127	671	588	1,259
10:00 PM	114	119	103	121	91	92	76	85	384	417	801
11:00 PM	85	85	97	94	89	61	79	70	350	310	660
12:00 AM	62	45	59	56	36	33	33	41	190	175	365
Total	3,204	3,085	3,380	3,254	3,233	3,124	3,286	3,123	13,103	12,586	25,689

Twenty-Four Hour Volume: **25,689** Vehicles Per Day

A.M. Peak Hour Is From **7:45 AM** **TO** **8:45 AM**
Volume of **1,723** **Is** **6.7%** **Of 24-Hour Volume**

P.M. Peak Hour Is From **5:00 PM** **TO** **6:00 PM**
Volume of **2,318** **Is** **9.0%** **Of 24-Hour Volume**

	% Northbound	% Southbound
AM Directional Distribution	34%	66%
PM Directional Distribution	57%	43%

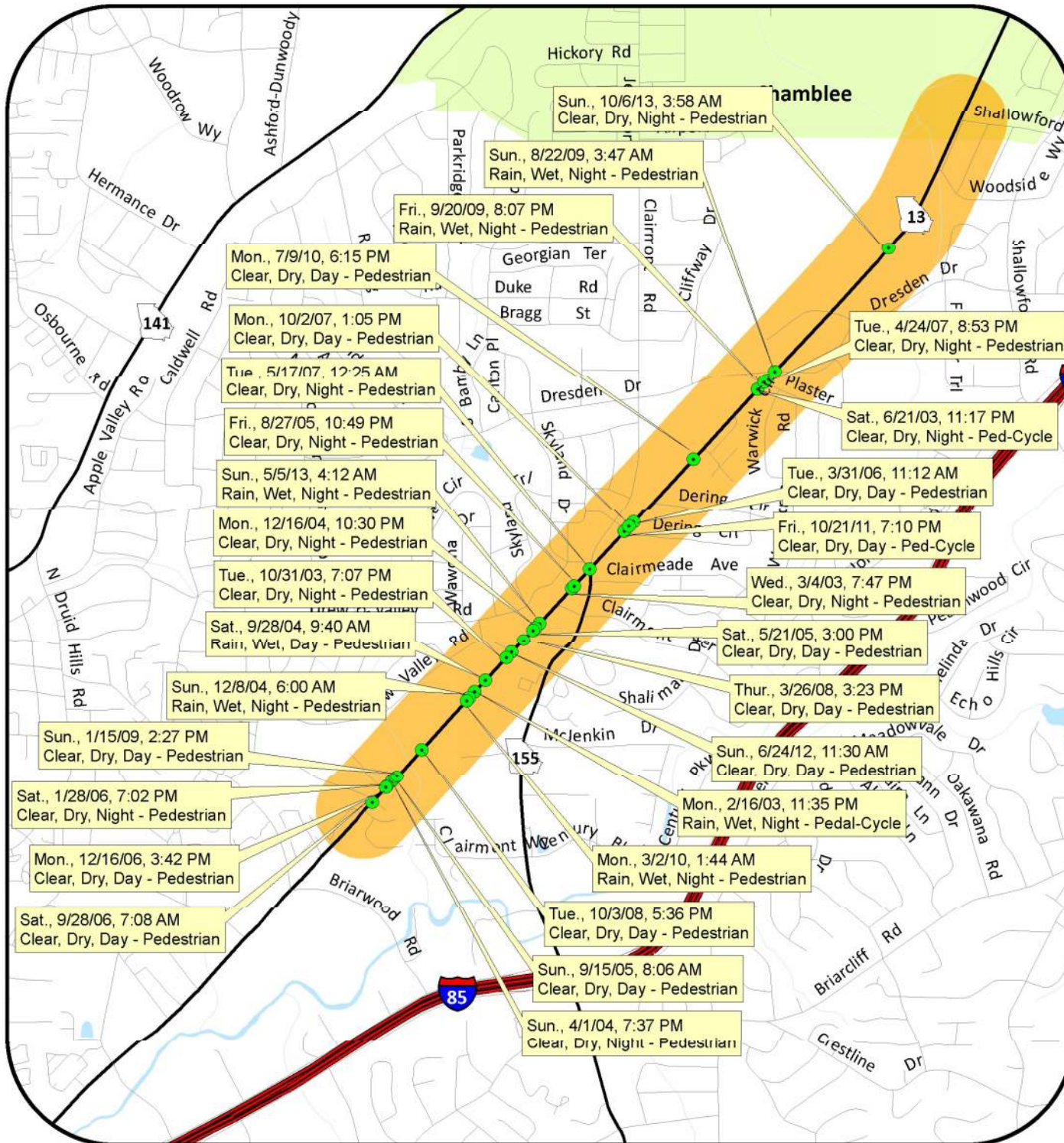
Machine Count Made By: *Southern Traffic Services*

Day-of-Week of Count: *Tuesday*

Date of Count: *25-Mar-14*

Report Prepared By: *JRA*

Date Report Prepared: *16-Dec-14*

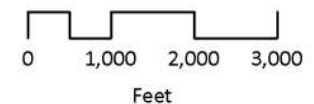


Buford Hwy Pedestrian Safety Project
P.I. #0009400
DeKalb County, Georgia
SR 13, from Afton Ln to Shallowford Ter, Phase II

Accident Diagram Pedestrian Collision Locations

Legend

- Bicycle/Pedestrian Collisions
- Study Area
- Interstate
- State Highway
- Local Roadway
- Ramp
- Lake/Pond
- Stream



DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

TRAFFIC ENGINEERING REPORT

For the intersection of:
STATE ROUTE 13, north of Dering Circle
In the County of DeKalb
At Mile log: 3.34



Report prepared by: Atkins
Name: Jimmy Adams, AICP
Title: Senior Transportation Planner
Address: 1600 River Edge Pkwy, NW, Suite 600, Atlanta, GA 30328

Telephone Number: (770) 933-0280
E-mail Address: jimmy.adams@atkinsglobal.com
FAX Number: (770) 933-1083

Date report prepared: March 2015

Location:

As illustrated on the cover sheet, the location for the proposed pedestrian hybrid beacon is along State Route 13 (Buford Highway) approximately 125 feet north of Dering Circle (most northern intersection with Buford Highway), in DeKalb County, GA. The location of the proposed pedestrian hybrid beacon is situated between the signalized intersections along Buford Highway at Clairmont Road and the Plaza Fiesta shopping center. Currently, at this location, there are primarily non-residential properties that consist of a mixture of land uses that generate considerable amounts of pedestrian traffic, along with three MARTA bus stops that are also within the immediate vicinity of the proposed location that have a high transit ridership serving MARTA bus route 39. An additional bus stop located along Buford Highway at Clairmont Road serves MARTA bus route 19 that also has a high transit ridership.

Reason for the Investigation:

This pedestrian hybrid beacon is to be installed as part of a GDOT Project, P.I. No. 0009400. The “purpose of” and “need for” this GDOT transportation project is for pedestrian safety along Buford Highway, from Afton Lane to Shallowford Terrace. Currently, between Afton Lane and Shallowford Terrace, numerous pedestrians cross Buford Highway to access a variety of residential, retail and office establishments. The placement of a pedestrian hybrid beacon at this location will work to provide an additional safe location for pedestrians to cross Buford Highway.

Description of the Intersection:

Buford Highway is classified as a principal urban arterial at this location with an existing typical section that consists of six 11-foot travel lanes, three in each direction, with a continuous two-way center left-turn lane. A raised concrete median has been proposed at this location to serve as pedestrian refuge. The proposed mid-block pedestrian crossing would be located between two signalized intersections that are located approximately four-tenths of one mile apart; therefore, this mid-block crossing would serve those pedestrians traveling to and from the MARTA bus stops along each side of Buford Highway, as well as the numerous non-residential establishments within the immediate vicinity of the proposed location. Lighting conditions along this portion of Buford Highway consist of minimal street level lighting, and the existing sidewalks are not well maintained and are not continuous, as frequent large gaps in the sidewalk system occur within this project area; this becomes evident with “worn” footpaths along each side of Buford Highway.

Traffic Engineering Report
State Route 13 Mid-Block Pedestrian Crossing
Page 3 of 15

Traffic Volumes in Vehicles per Day (vpd):

Latest year percent trucks: Not Available

Latest year 24 hour percent trucks: Not Available

24-Hour Machine Tube Counts that were collected on March 25th, 2014 are provided as an attachment to this report.

Existing Traffic Control:

Buford Highway is not controlled at this proposed pedestrian hybrid beacon location.

Vehicular Speeds:

The posted speed limit along Buford Highway is 45 mph.

Pedestrian Movements:

- The east and west portions of Buford Highway at the proposed location consists predominately of retail and service establishments. Sidewalks along this portion of Buford Highway are not continuous.
- Pedestrian observations were conducted on December 4th, 2014, between the hours of 6:00 a.m. and 8:00 p.m. During this fourteen hour period, there were 117 pedestrians observed crossing Buford Highway.

Other Modes of Transportation Present:

Transit bus service is provided by MARTA for pedestrians within this project corridor. Specifically, MARTA Bus Route #39 serves the Doraville Rail Station and the Lindbergh Rail Station along Buford Highway. Within the immediate vicinity of this proposed mid-block crossing location there are three MARTA bus stop locations serving bus route #39. Two of these bus stop locations are for buses traveling southbound along Buford Highway, while the remaining location is for buses traveling northbound. Additional transit services can be reached at each of the rail stations through partner systems that have been established between the Georgia Regional Transportation Authority, Gwinnett County Transit, Cobb Community Transit and Clayton County Transit.

Delay:

No significant delays are expected to occur as a result of the placement of a pedestrian hybrid beacon at this location.

Parking:

No parking activity was observed or is expected to occur at the proposed location for the pedestrian hybrid beacon.

Accident History:

For the purposes of this analysis, accidents that occurred between Afton Lane and Shallowford Terrace were evaluated. Accidents were reviewed for the years 2003 to 2013. There have been a total of 1,608 collisions within the study corridor, 29 of which involved pedestrians. The pedestrian collisions resulted in 35 injuries and three fatalities. It is expected that additional protected pedestrian crossings within the study corridor would work to prevent the number of pedestrian collisions. The types of collisions within the study corridor are summarized in Table 1 and a collision diagram for the pedestrian accidents is provided as an attachment to this report. A detailed review of the accident data indicates that six of these pedestrian collisions were within the immediate vicinity of the proposed location for the pedestrian hybrid beacon. These collisions resulted in eleven injuries and no fatalities.

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Table 1
Accident History

Year	Accidents								Injury	Fatal	Pedestrians Involved
	Rear- end	Side- swipe	Angle	Head- on	Struck Object	Run off	Other	Total			
2003	71	24	55	3			14	167	77	0	4
2004	62	20	40	6			7	135	74	1	4
2005	94	21	83	6			11	215	112	2	3
2006	74	20	55	5			14	168	62	0	4
2007	70	21	40	4			7	142	60	0	3
2008	57	24	42	8			12	143	59	0	2
2009	35	18	43	7			5	108	50	0	3
2010	28	16	42	3			7	96	41	2	2
2011	56	19	43	6			12	136	71	2	1
2012	43	15	39	7			7	111	33	0	1
2013	43	27	99	5			13	187	46	0	2
Totals:	633	225	581	60			109	1608	685	7	29

*Pedestrians include bicycle and pedestrian traffic.

Adjacent Signalized Intersections:

There is a traffic signal located at the intersection of Buford Highway @ Clairmont Road, approximately 1,570 feet south of the subject location. There is an additional signal located at the intersection of Buford Highway @ the Plaza Fiesta shopping center, approximately 520 feet north of the subject location.

Warrant Analysis:

Guidelines used to justify the placement of a pedestrian hybrid beacon were taken from the Manual on Uniform Traffic Control Devices (MUTCD) 2009 edition, Chapter 4F. A pedestrian hybrid beacon may be considered for installation to facilitate pedestrian crossings at locations that do not meet traffic signal warrants. Criteria from the MUTCD, 2009 edition for roadway facilities that operate in excess of 35 mph were utilized for this analysis. The need for a pedestrian hybrid beacon should be considered when the number of vehicles per hour (total of both approaches) and the corresponding total of all pedestrians crossing the major street for a one hour period (any four consecutive 15-minute periods) exceed the plotted curve on Figure 4F-2 that represents the length of the subject crosswalk. The placement of a pedestrian hybrid beacon should consider the major street volumes, speeds, widths and gaps in conjunction with pedestrian volumes, walking speeds and delay.

In order to evaluate the proposed location for the placement of a pedestrian hybrid beacon, typical weekday pedestrian activity between the hours of 6:00 AM and 8:00 PM were observed on December 4th, 2014. Corresponding traffic data was also collected for the proposed pedestrian hybrid beacon on March 25th, 2014. These data are illustrated in Table 2 and have revealed that during a typical weekday approximately 120 pedestrians cross Buford Highway at the proposed location. These pedestrian crossings were evaluated for one-hour periods using any four consecutive 15-minute time periods available. These data have indicated that a pedestrian hybrid beacon would be justified at the proposed location because the number of pedestrians per hour exceeds the lower threshold volume of twenty (20) pedestrians per hour during one of the hours examined. The time period that satisfies the conditions for a pedestrian hybrid beacon has been summarized in Table 3. The results of this analysis are illustrated on Figure 1.

Table 2
Hourly Pedestrian Movements (Location #4)
Vicinity of QuikTrip and Dering Circle

Time	Vehicles Per Hour	Pedestrians Per Hour
5:45-6:45 AM	435	not available
6:45-7:45 AM	852	6
7:45-8:45 AM	1369	4
8:45-9:45 AM	1079	10
9:45-10:45 AM	984	6
10:45-11:45 AM	1124	17
11:45-12:45 PM	1485	8
12:45-1:45 PM	1562	9
1:45-2:45 PM	1468	2
2:45-3:45 PM	1587	21
3:45-4:45 PM	1780	9
4:45-5:45 PM	2036	8
5:45-6:45 PM	1904	7
6:45-7:45 PM	1548	7

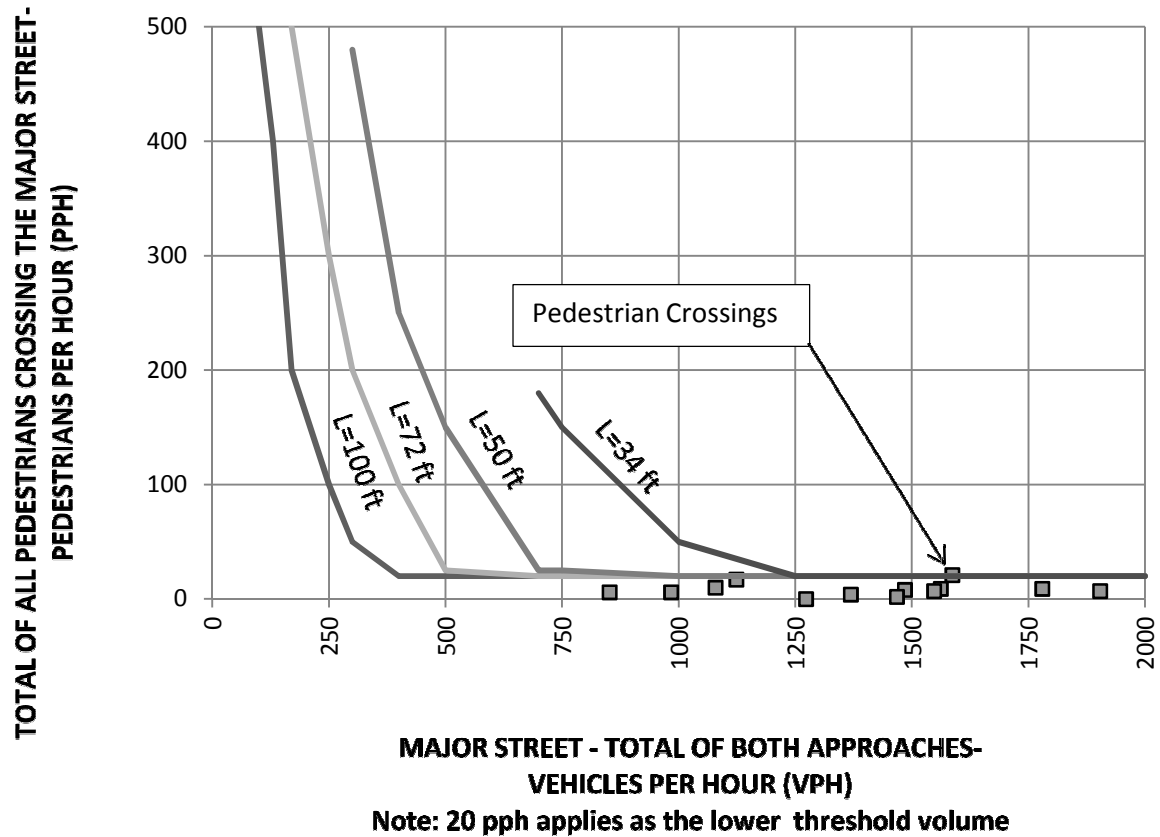
*This table reflects the counts that were conducted in the vicinity of Drew Valley Road and Druid Towne Apartments along SR 13.

Table 3
Warranted Conditions (Location #4)
Vicinity of QuikTrip and Dering Circle

Baseline for 72 ft (4F-2)		TIME	VPH (SR 13)	PPH (SR 13)	CONDITION
VPH	PPH				
1500	20	2:45-3:45 PM	1,587	21	MET

*This table illustrates the hours met from the conducted counts.

Figure 1
Guidelines for the Installation of Pedestrian Hybrid Beacons on High-Speed Roadways



Roundabout

As per GDOT Policy 4A-2, this portion of Buford Highway has been considered to determine if a roundabout will perform acceptably at a minor street approach within close proximity to the proposed pedestrian hybrid beacon. The analysis indicates that the proposed location is situated within close proximity to numerous non-residential driveways and to Dering Circle; however, the traffic volumes at these locations are anticipated to remain too low for the placement of a traffic signal. Additionally, it would be expected that the percent of traffic on State Route 13 would exceed 90 percent of the total traffic entering the intersection within close proximity to the proposed pedestrian hybrid beacon. Therefore, it was determined that a roundabout at this location would not be appropriate or operate acceptably at any nearby intersection.

Recommendations:

A number of issues that included predominately non-residential land uses, transit ridership and observed pedestrian crossings worked to establish the location of this proposed pedestrian hybrid beacon. Even though this area to be served by this proposed pedestrian hybrid beacon does not experience an extremely high volume of pedestrian activity, there is one period observed that satisfies pedestrian crossing guidelines as indicated in section 4F.02.04A of the MUTCD, 2009 edition. The proposed location may also work to reverse the history of pedestrian accidents, injuries and deaths within the corridor.

In order to maximize the utilization of the proposed pedestrian hybrid beacon, the location was selected at a location where the highest number of pedestrians were observed crossing Buford Highway. The proposed pedestrian hybrid beacon is located approximately 1,570 feet north of Clairmont Road along Buford Highway and approximately 520 feet south of the nearest signalized intersection along Buford Highway at the Plaza Fiesta shopping center.

The location of the proposed pedestrian hybrid beacon does not meet the guidance provided in section 4F.02.04.A of the MUTCD, 2009 edition: “The pedestrian hybrid beacon should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs”. There are numerous driveways within close proximity to the proposed location of the pedestrian hybrid beacon; therefore, due to the number of existing driveways, it was not possible to meet the guidance for a 100’ offset from driveways. It is recommended that the proposed location remain as proposed even though this location is not in accordance with the suggested 100-foot guidance. Furthermore, it is recommended that a signal permit be issued for the installation of a pedestrian hybrid beacon along Buford Highway, approximately 1,570 feet north of Clairmont Road. Criteria from the MUTCD, 2009 edition, chapter 4F, for roadway facilities that operate in excess of 35 mph were satisfied for this analysis.

Traffic Engineering Report
State Route 13 Mid-Block Pedestrian Crossing
Page 10 of 15

RECOMMENDED BY: _____
District Traffic Engineer

DATE: _____

RECOMMENDED BY: _____
State Traffic Engineer

DATE: _____

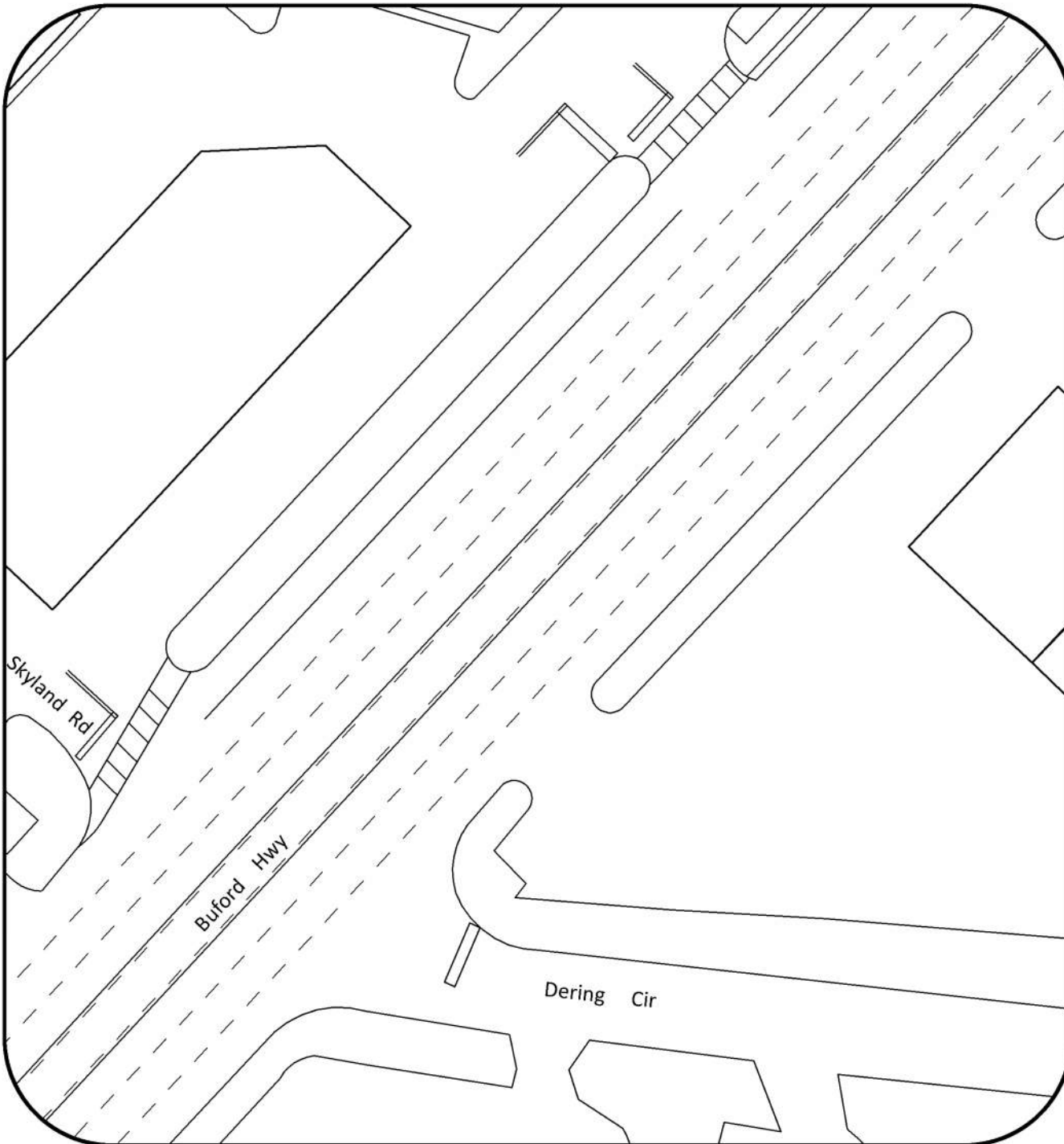
APPROVED BY: _____
Director of Operations

DATE: _____

Traffic Engineering Report
State Route 13 Mid-Block Pedestrian Crossing
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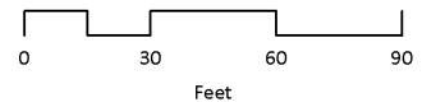
Traffic Engineering Report Appendix

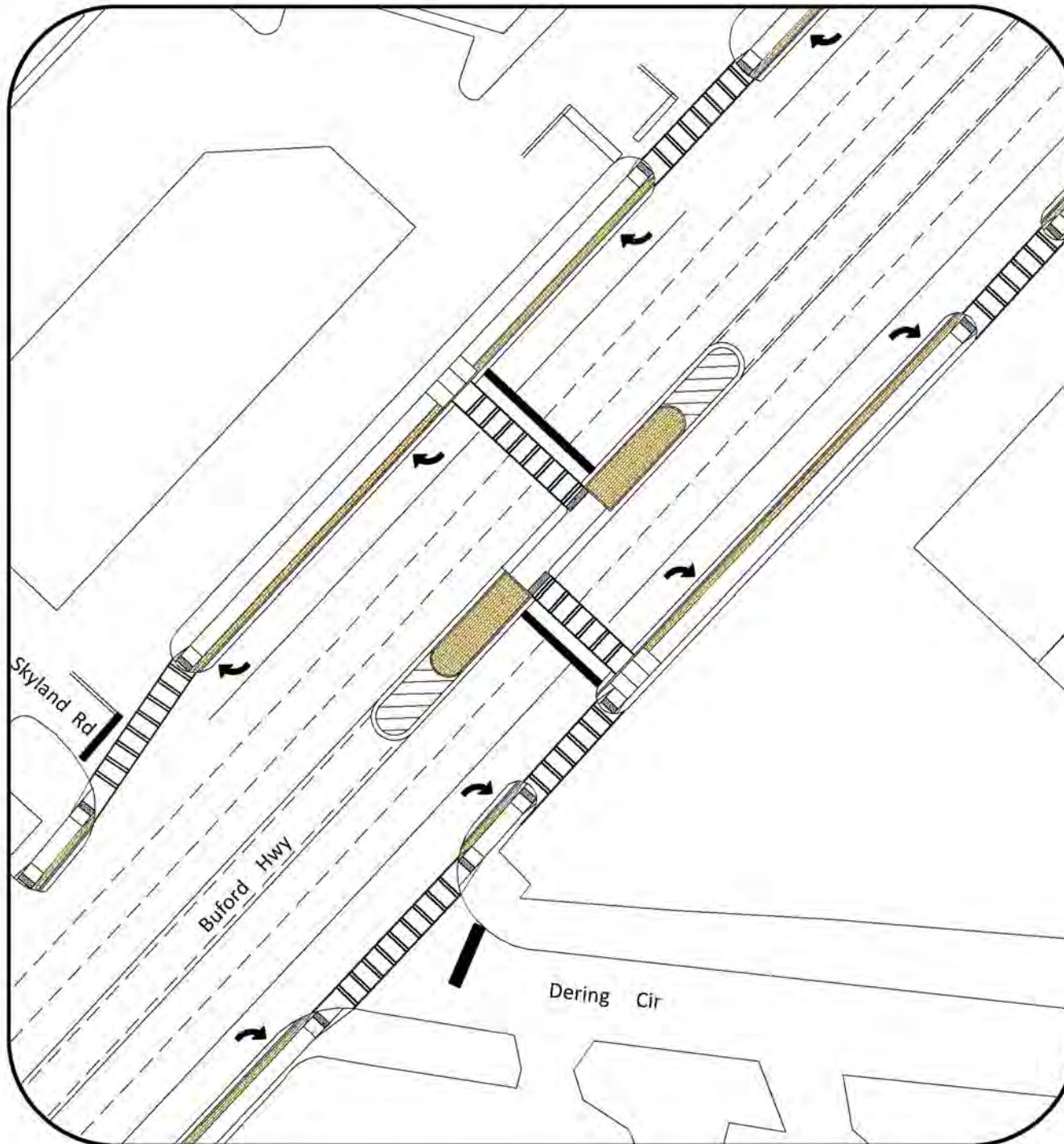
- Sketch of the present intersection.
- Sketch of the proposed intersection.
- Traffic Count Summary Sheets.
- Collision Diagram.



Buford Hwy Pedestrian Safety Project
P.I. #0009400
DeKalb County, Georgia
SR 13, from Afton Ln to Shallowford Ter, Phase II

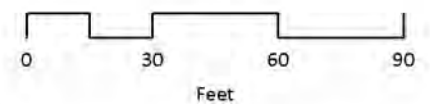
Existing Conditions





Buford Hwy Pedestrian Safety Project
P.I. #0009400
DeKalb County, Georgia
SR 13, from Afton Ln to Shallowford Ter, Phase II

Build Conditions



Atkins

Twenty-Four Hour Traffic Count

Location: Buford Hwy, south of Fiesta Plaza (9057)

Hour Ending	1st		2nd		3rd		4th		Total		TOTAL
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound	
1:00 AM	41	50	31	27	41	26	30	18	143	121	264
2:00 AM	22	18	27	25	79	20	20	16	148	79	227
3:00 AM	12	22	28	16	19	20	23	14	82	72	154
4:00 AM	30	25	35	34	21	21	22	30	108	110	218
5:00 AM	34	33	67	19	44	50	33	13	178	115	293
6:00 AM	18	20	20	27	43	23	49	35	130	105	235
7:00 AM	41	48	66	58	69	69	71	89	247	264	511
8:00 AM	85	112	96	112	115	172	124	187	420	583	1,003
9:00 AM	127	231	125	224	132	219	115	182	499	856	1,355
10:00 AM	104	175	90	145	111	157	137	131	442	608	1,050
11:00 AM	108	135	111	131	124	107	129	116	472	489	961
12:00 PM	135	144	141	133	157	169	194	160	627	606	1,233
1:00 PM	198	178	192	176	203	184	203	195	796	733	1,529
2:00 PM	228	171	182	185	200	198	218	186	828	740	1,568
3:00 PM	194	154	187	178	167	184	210	187	758	703	1,461
4:00 PM	196	166	228	187	223	190	228	162	875	705	1,580
5:00 PM	258	197	257	205	276	197	257	206	1,048	805	1,853
6:00 PM	306	228	309	210	297	223	304	189	1,216	850	2,066
7:00 PM	301	221	269	196	235	189	226	204	1,031	810	1,841
8:00 PM	211	192	189	164	181	181	187	162	768	699	1,467
9:00 PM	192	149	151	141	139	152	151	98	633	540	1,173
10:00 PM	121	104	92	88	91	80	82	74	386	346	732
11:00 PM	93	86	82	64	85	49	77	53	337	252	589
12:00 AM	65	55	64	42	52	30	40	39	221	166	387
Total	3,120	2,914	3,039	2,787	3,104	2,910	3,130	2,746	12,393	11,357	23,750

Twenty-Four Hour Volume: **23,750** Vehicles Per Day

A.M. Peak Hour Is From **7:45 AM** TO **8:45 AM**
 Volume of **1,369** Is **5.8%** Of 24-Hour Volume

P.M. Peak Hour Is From **5:00 PM** TO **6:00 PM**
 Volume of **2,066** Is **8.7%** Of 24-Hour Volume

Machine Count Made By: *Southern Traffic Services*
 Day-of-Week of Count: *Tuesday*
 Date of Count: *25-Mar-14*
 Report Prepared By: *JRA*
 Date Report Prepared: *16-Dec-14*

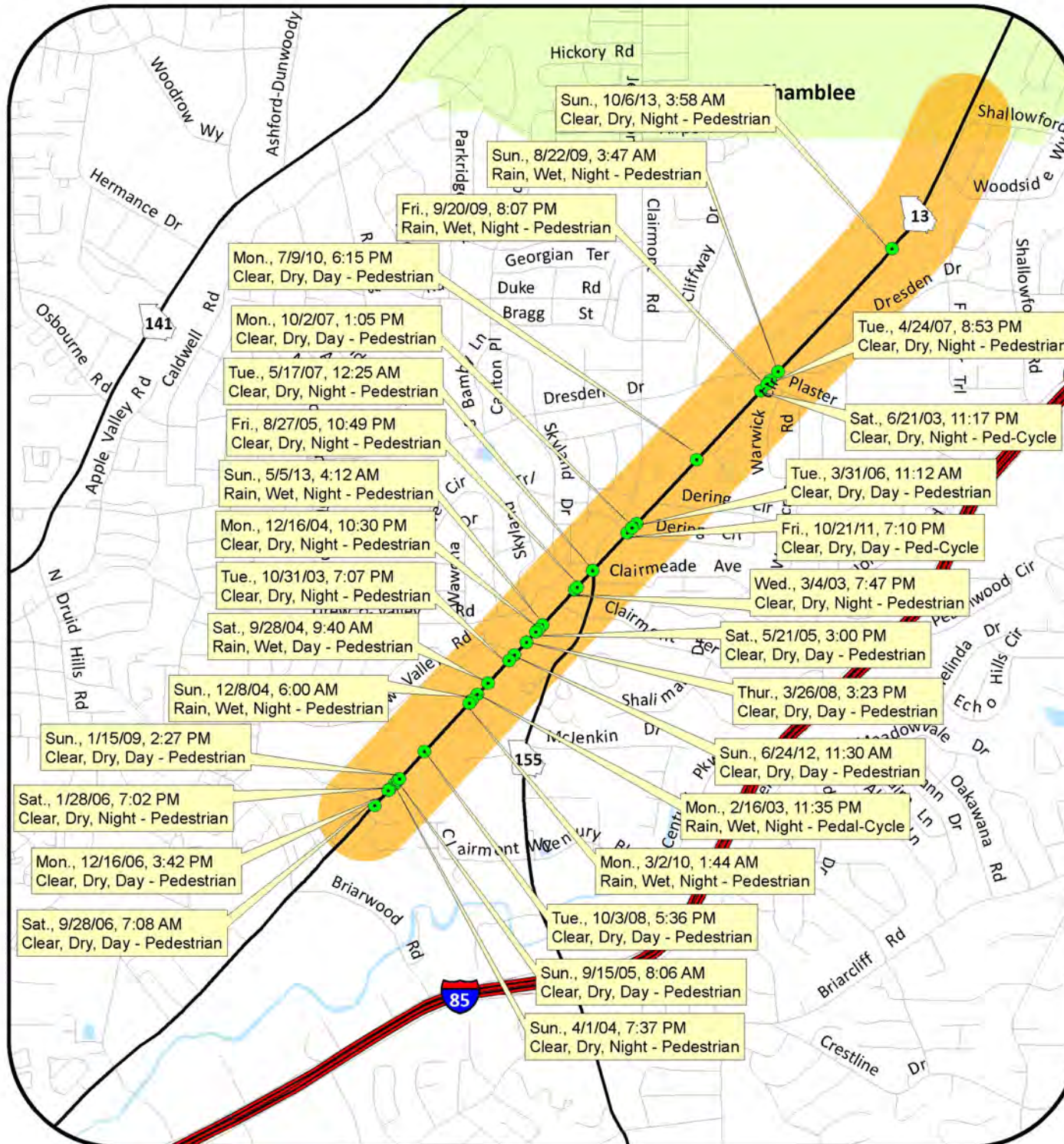
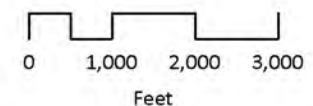
	% Northbound	% Southbound
AM Directional Distribution	37%	63%
PM Directional Distribution	59%	41%

Buford Hwy Pedestrian Safety Project
P.I. #0009400
DeKalb County, Georgia
SR 13, from Afton Ln to Shallowford Ter, Phase II

Accident Diagram
Pedestrian Collision Locations

Legend

-  Bicycle/Pedestrian Collisions
-  Study Area
-  Interstate
-  State Highway
-  Local Roadway
-  Ramp
-  Lake/Pond
-  Stream



DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

TRAFFIC ENGINEERING REPORT

For the intersection of:
STATE ROUTE 13, between Dering Circle and Plaster Road
In the County of **DeKalb**
At Mile log: **3.51**



Report prepared by: Atkins
Name: Jimmy Adams, AICP
Title: Senior Transportation Planner
Address: 1600 River Edge Pkwy, NW, Suite 600, Atlanta, GA 30328

Telephone Number: (770) 933-0280
E-mail Address: jimmy.adams@atkinsglobal.com
FAX Number: (770) 933-1083

Date report prepared: March 2015

Location:

As illustrated on the cover sheet, the location for the proposed pedestrian hybrid beacon is along State Route 13 (Buford Highway) approximately 375 feet north of the main access to the Plaza Fiesta shopping center, in DeKalb County, GA. This area is characterized as predominately non-residential consisting of numerous retail and service type establishments; however, there are additional multi-family dwelling units located north of the location for the proposed pedestrian hybrid beacon. Both the residential and non-residential land uses within the immediate vicinity of this proposed location generate a considerable amount of pedestrian traffic. There are two MARTA bus stops that are also within walking distance of the proposed location that have a high transit ridership serving MARTA bus route 39.

Reason for the Investigation:

This pedestrian hybrid beacon is to be installed as part of a GDOT Project, P.I. No. 0009400. The “purpose of” and “need for” this GDOT transportation project is for pedestrian safety along Buford Highway, from Afton Lane to Shallowford Terrace. Currently, between Afton Lane and Shallowford Terrace, numerous pedestrians cross Buford Highway to access a variety of residential, retail and office establishments. The placement of a pedestrian hybrid beacon at this location will work to provide an additional safe location for pedestrians to cross Buford Highway.

Description of the Intersection:

Buford Highway is classified as a principal urban arterial at this location with an existing typical section that consists of six 11-foot travel lanes, three in each direction, with a continuous two-way center left-turn lane. A raised concrete median has been proposed at this location to serve as pedestrian refuge. The proposed mid-block pedestrian crossing would be located between two signalized intersections that are located approximately 0.35 miles apart; therefore, this mid-block crossing would serve those pedestrians traveling to and from the MARTA bus stops along each side of Buford Highway, as well as, a mixture of land uses located within the study area. Lighting conditions along this portion of Buford Highway consist of minimal street level lighting, and the existing sidewalks are not well maintained and are not continuous as, frequent large gaps in the sidewalk system occur within this project area; this becomes evident with “worn” footpaths along each side of Buford Highway.

Traffic Engineering Report
State Route 13 Mid-Block Pedestrian Crossing
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Traffic Volumes in Vehicles per Day (vpd):

Latest year percent trucks: Not Available

Latest year 24 hour percent trucks: Not Available

24-Hour Machine Tube Counts that were collected on March 25th, 2014 are provided as an attachment to this report.

Existing Traffic Control:

Buford Highway is not controlled at this proposed pedestrian hybrid beacon location.

Vehicular Speeds:

The posted speed limit along Buford Highway is 45 mph.

Pedestrian Movements:

- The east and west sides of Buford Highway at the proposed location mainly consists of non-residential land uses that are comprised of various retail and service establishments. Sidewalks along this portion of Buford Highway are not continuous.
- The east side of Buford Highway at the proposed location includes multi-family dwelling units. Sidewalks along this portion of Buford Highway are not continuous.
- Pedestrian observations were conducted on December 4th, 2014, between the hours of 6:00 a.m. and 8:00 p.m. During this fourteen hour period, there was approximately 430 pedestrians observed crossing Buford Highway.

Other Modes of Transportation Present:

Transit bus service is provided by MARTA for pedestrians within this project corridor. Specifically, MARTA Bus Route #39 serves the Doraville Rail Station and the Lindbergh Rail Station along Buford Highway. Within the immediate vicinity of this proposed mid-block crossing location there are two MARTA bus stop locations serving bus route #39. One of these bus stop locations is for buses traveling southbound along Buford Highway, while the remaining location is for buses traveling northbound. Additional transit services can be reached at each of the rail stations through partner systems that have been established between the Georgia Regional Transportation Authority, Gwinnett County Transit, Cobb Community Transit and Clayton County Transit.

Delay:

No significant delays are expected to occur as a result of the placement of a pedestrian hybrid beacon at this location.

Parking:

No parking activity was observed or is expected to occur at the proposed location for the pedestrian hybrid beacon.

Accident History:

For the purposes of this analysis, accidents that occurred between Afton Lane and Shallowford Terrace were evaluated. Accidents were reviewed for the years 2003 to 2013. There have been a total of 1,608 collisions within the study corridor, 29 of which involved pedestrians. The pedestrian collisions resulted in 35 injuries and three fatalities. It is expected that additional protected pedestrian crossings within the study corridor would work to prevent the number of pedestrian collisions. The types of collisions within the study corridor are summarized in Table 1 and a collision diagram for the pedestrian accidents is provided as an attachment to this report. A detailed review of the accident data indicates that five of these pedestrian collisions were within the immediate vicinity of the proposed location for the pedestrian hybrid beacon. These collisions resulted in six injuries and no fatalities.

Traffic Engineering Report
State Route 13 Mid-Block Pedestrian Crossing
Page 5 of 16

Table 1
Accident History

Year	Accidents								Injury	Fatal	Pedestrians Involved
	Rear- end	Side- swipe	Angle	Head- on	Struck Object	Run off	Other	Total			
2003	71	24	55	3			14	167	77	0	4
2004	62	20	40	6			7	135	74	1	4
2005	94	21	83	6			11	215	112	2	3
2006	74	20	55	5			14	168	62	0	4
2007	70	21	40	4			7	142	60	0	3
2008	57	24	42	8			12	143	59	0	2
2009	35	18	43	7			5	108	50	0	3
2010	28	16	42	3			7	96	41	2	2
2011	56	19	43	6			12	136	71	2	1
2012	43	15	39	7			7	111	33	0	1
2013	43	27	99	5			13	187	46	0	2
Totals:	633	225	581	60			109	1608	685	7	29

*Pedestrians include bicycle and pedestrian traffic.

Adjacent Signalized Intersections:

There is a traffic signal located at the intersection of Buford Highway @ the Plaza Fiesta shopping center, approximately 375 feet south of the subject location. There is an additional signal located at the intersection of Buford Highway @ Plaster Road, approximately 1,505 feet north of the subject location.

Warrant Analysis:

Guidelines used to justify the placement of a pedestrian hybrid beacon were taken from the Manual on Uniform Traffic Control Devices (MUTCD) 2009 edition, Chapter 4F. A pedestrian hybrid beacon may be considered for installation to facilitate pedestrian crossings at locations that do not meet traffic signal warrants. Criteria from the MUTCD, 2009 edition for roadway facilities that operate in excess of 35 mph were utilized for this analysis. The need for a pedestrian hybrid beacon should be considered when the number of vehicles per hour (total of both approaches) and the corresponding total of all pedestrians crossing the major street for a one hour period (any four consecutive 15-minute periods) exceed the plotted curve on Figure 4F-2 that represents the length of the subject crosswalk. The placement of a pedestrian hybrid beacon should consider the major street volumes, speeds, widths and gaps in conjunction with pedestrian volumes, walking speeds and delay.

In order to evaluate the proposed location for the placement of a pedestrian hybrid beacon, typical weekday pedestrian activity between the hours of 6:00 AM and 8:00 PM were observed on December 4th, 2014. Corresponding traffic data was also collected for the proposed pedestrian hybrid beacon on March 25th, 2014. These data are illustrated in Table 2 and have revealed that during a typical weekday over 400 pedestrians cross Buford Highway. These pedestrian crossings were evaluated for one-hour periods using any four consecutive 15-minute time periods available. These data have indicated that a pedestrian hybrid beacon would be justified at the proposed location because the number of pedestrians per hour repeatedly exceeds the lower threshold volume of twenty (20) pedestrians per hour. The time periods that comprehensively satisfy the conditions for a pedestrian hybrid beacon are summarized in Table 3. The results of this analysis are illustrated on Figure 1.

Table 2
Hourly Pedestrian Movements (Location #5)
Vicinity of Pep Boys and Hall Mark Apartments

Time	Vehicles Per Hour	Pedestrians Per Hour
6:00-7:00 AM	518	7
7:00-8:00 AM	996	7
8:00-9:00 AM	1350	11
9:00-10:00 AM	1076	11
10:00-11:00 AM	949	19
11:00-12:00 PM	1223	34
12:00-1:00 PM	1507	35
1:00-2:00 PM	1500	28
2:00-3:00 PM	1468	44
3:00-4:00 PM	1546	62
4:00-5:00 PM	1849	59
5:00-6:00 PM	2080	52
6:00-7:00 PM	1858	34
7:00-8:00 PM	1419	25

*This table reflects the counts that were conducted in the vicinity of Pep Boys and Hall Mark Apartments along SR 13.

Traffic Engineering Report
State Route 13 Mid-Block Pedestrian Crossing
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Table 3
Warranted Conditions (Location #5)
Vicinity of Pep Boys and Hall Mark Apartments

Baseline for 72 ft (4F-2)		TIME	VPH (SR 13)	PPH (SR 13)	CONDITION
VPH	PPH				
750	20	10:15-11:15 AM	977	20	MET
1000	20	10:30-11:30 AM	1033	32	MET
1000	20	10:45-11:45 AM	1107	36	MET
1000	20	11:00-12:00 PM	1223	34	MET
1250	20	11:15-12:15 PM	1311	37	MET
1250	20	11:30-12:30 PM	1400	29	MET
1250	20	11:45-12:45 PM	1457	29	MET
1500	20	12:00-1:00 PM	1507	35	MET
1500	20	12:15-1:15 PM	1554	29	MET
1500	20	12:30-1:30 PM	1528	27	MET
1500	20	12:45-1:45 PM	1534	29	MET
1500	20	1:00-2:00 PM	1500	28	MET
1250	20	1:15-2:15 PM	1461	34	MET
1250	20	1:30-2:30 PM	1473	35	MET
1250	20	1:45-2:45 PM	1459	38	MET
1250	20	2:00-3:00 PM	1468	44	MET
1250	20	2:15-3:15 PM	1461	44	MET
1500	20	2:30-3:30 PM	1500	55	MET
1500	20	2:45-3:45 PM	1549	58	MET
1500	20	3:00-4:00 PM	1546	62	MET
1500	20	3:15-4:15 PM	1618	76	MET
1500	20	3:30-4:30 PM	1693	73	MET
1500	20	3:45-4:45 PM	1744	66	MET
1750	20	4:00-5:00 PM	1849	59	MET
1750	20	4:15-5:15 PM	1934	43	MET
1750	20	4:30-5:30 PM	1982	34	MET
2000	20	4:45-5:45 PM	2051	46	MET
2000	20	5:00-6:00 PM	2080	52	MET
2000	20	5:15-6:15 PM	2084	56	MET
2000	20	5:30-6:30 PM	2044	53	MET
1750	20	5:45-6:45 PM	1937	45	MET

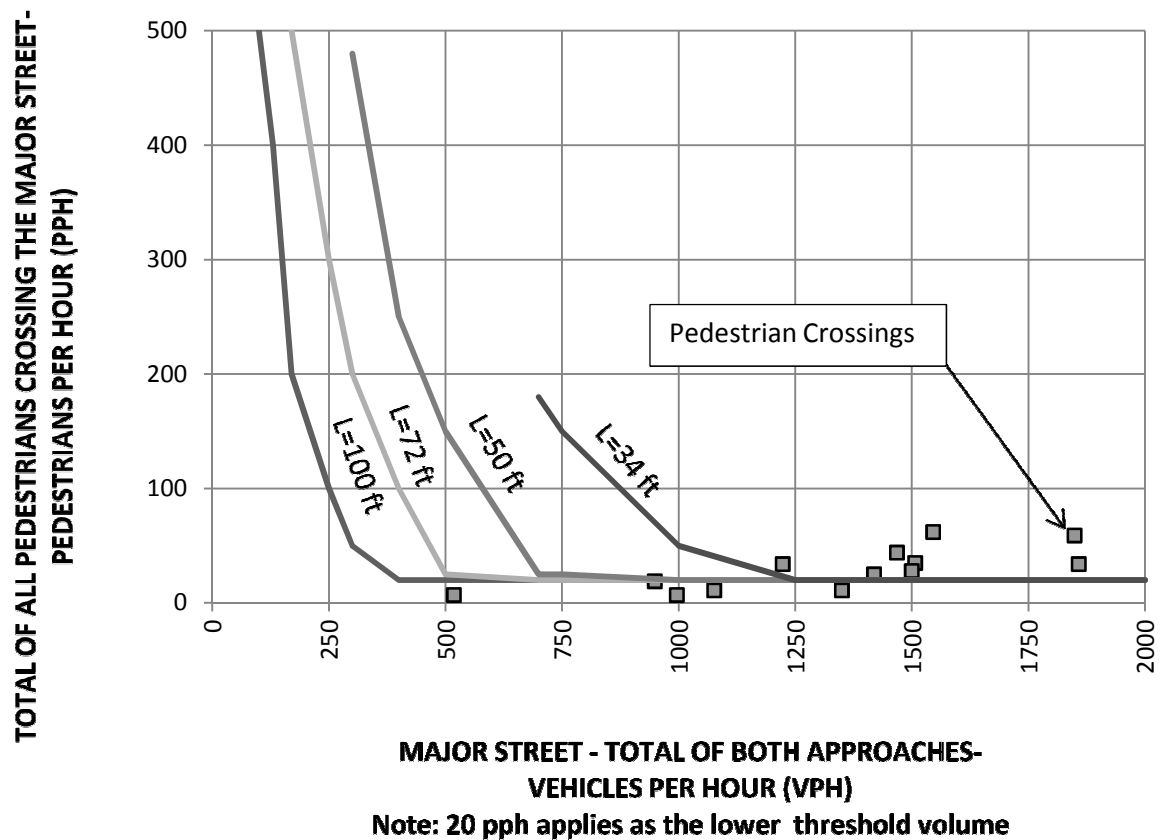
*This table illustrates the hours met from the conducted counts.

Table 3, cont'd
Warranted Conditions (Location #5)
Vicinity of Pep Boys and Hall Mark Apartments

Baseline for 72 ft (4F-2)		TIME	VPH (SR 13)	PPH (SR 13)	CONDITION
VPH	PPH				
1750	20	6:00-7:00 PM	1858	34	MET
1500	20	6:15-7:15 PM	1707	26	MET
1500	20	6:30-6:30 PM	1575	26	MET
1500	20	6:45-7:45 PM	1502	25	MET
1000	20	7:00-8:00 PM	1419	25	MET

*This table illustrates the hours met from the conducted counts.

Figure 1
Guidelines for the Installation of Pedestrian Hybrid Beacons on High-Speed Roadways



Roundabout

As per GDOT Policy 4A-2, this portion of Buford Highway has been considered to determine if a roundabout will perform acceptably at a minor street approach within close proximity to the proposed pedestrian hybrid beacon. The analysis indicates that the proposed location is situated within close proximity to numerous non-residential driveways and to Oak Shadow Drive; however, the traffic volumes at these locations are anticipated to remain too low for the placement of a traffic signal. Additionally, it would be expected that the percent of traffic on State Route 13 would exceed 90 percent of the total traffic entering the intersection within close proximity to the proposed pedestrian hybrid beacon. Therefore, it was determined that a roundabout at this location would not be appropriate or operate acceptably at any nearby intersection.

Recommendations:

A number of issues that included residential and non-residential land uses, transit ridership and observed pedestrian crossings worked to establish the location of this proposed pedestrian hybrid beacon. The area to be served by this pedestrian hybrid beacon experiences a high volume of pedestrian activity due to the presence of a mixture of land uses to the east and west of Buford Highway between the traffic signals along Buford Highway at Plaza Fiesta and Plaster Road. The proposed location may also work to reverse the history of pedestrian accidents, injuries and deaths within the corridor.

In order to maximize the utilization of the proposed pedestrian hybrid beacon, the location was selected at a location where a high number of pedestrians were observed crossing Buford Highway. The proposed pedestrian hybrid beacon is approximately 375 feet north of the main access provided for the Plaza Fiesta shopping center, which is the nearest signalized intersection along Buford Highway at the proposed location.

Traffic Engineering Report
State Route 13 Mid-Block Pedestrian Crossing
Page 11 of 16

The location of the proposed pedestrian hybrid beacon does not meet the guidance provided in section 4F.02.04.A of the MUTCD, 2009 edition: “The pedestrian hybrid beacon should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs”. There are numerous driveways within close proximity to the proposed location of the pedestrian hybrid beacon; therefore, due to the number of existing driveways, it was not possible to meet the guidance for a 100’ offset from driveways. It is recommended that the proposed location remain as proposed even though this location is not in accordance with the suggested 100-foot guidance. Furthermore, it is recommended that a signal permit be issued for the installation of a pedestrian hybrid beacon along Buford Highway, approximately 375 feet north of the Plaza Fiesta shopping center. Criteria from the MUTCD, 2009 edition, chapter 4F, for roadway facilities that operate in excess of 35 mph were satisfied for this analysis.

RECOMMENDED BY: _____
District Traffic Engineer

DATE: _____

RECOMMENDED BY: _____
State Traffic Engineer

DATE: _____

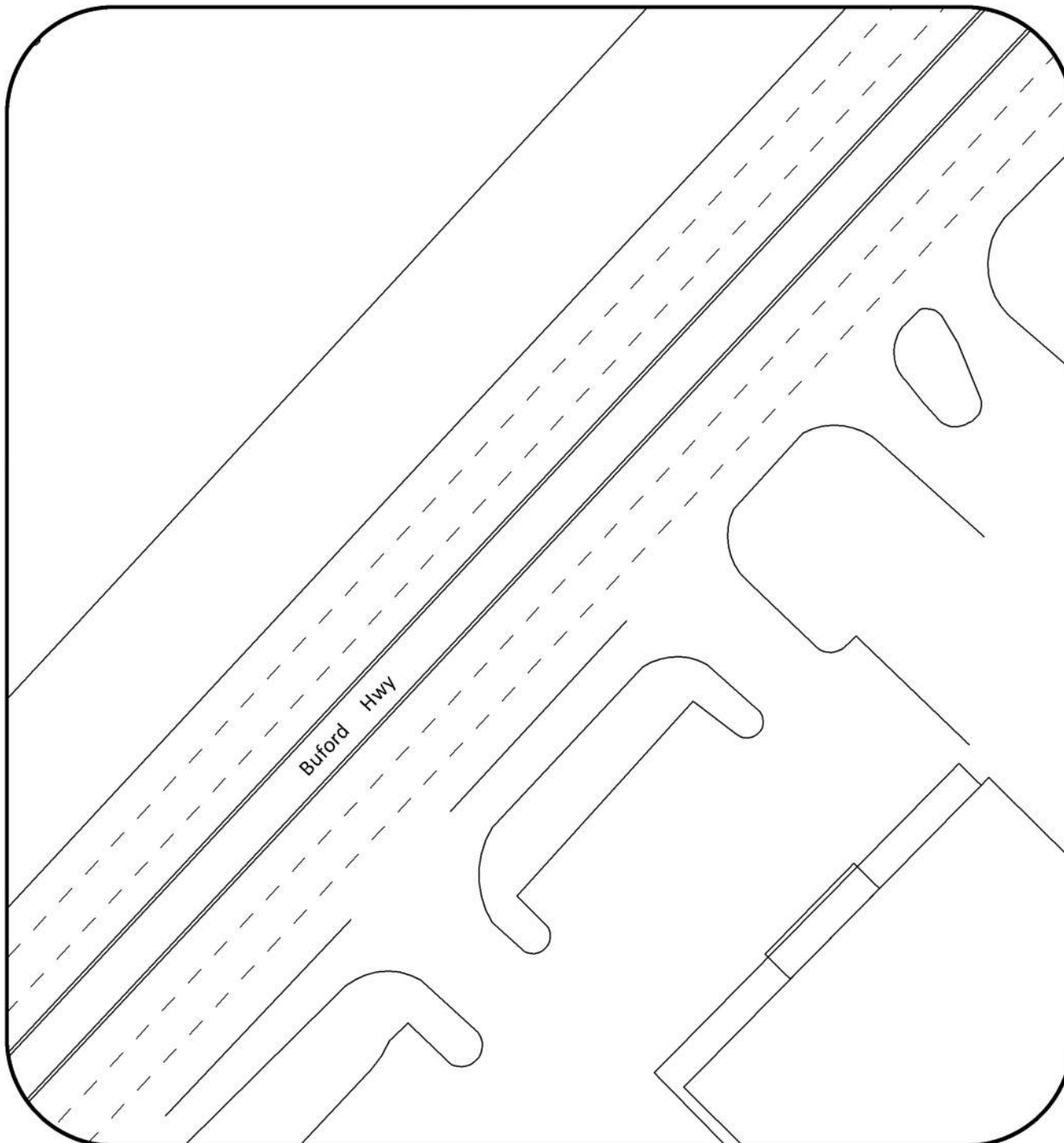
APPROVED BY: _____
Director of Operations

DATE: _____

Traffic Engineering Report
State Route 13 Mid-Block Pedestrian Crossing
Page 12 of 16

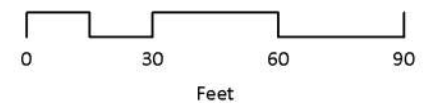
Traffic Engineering Report Appendix

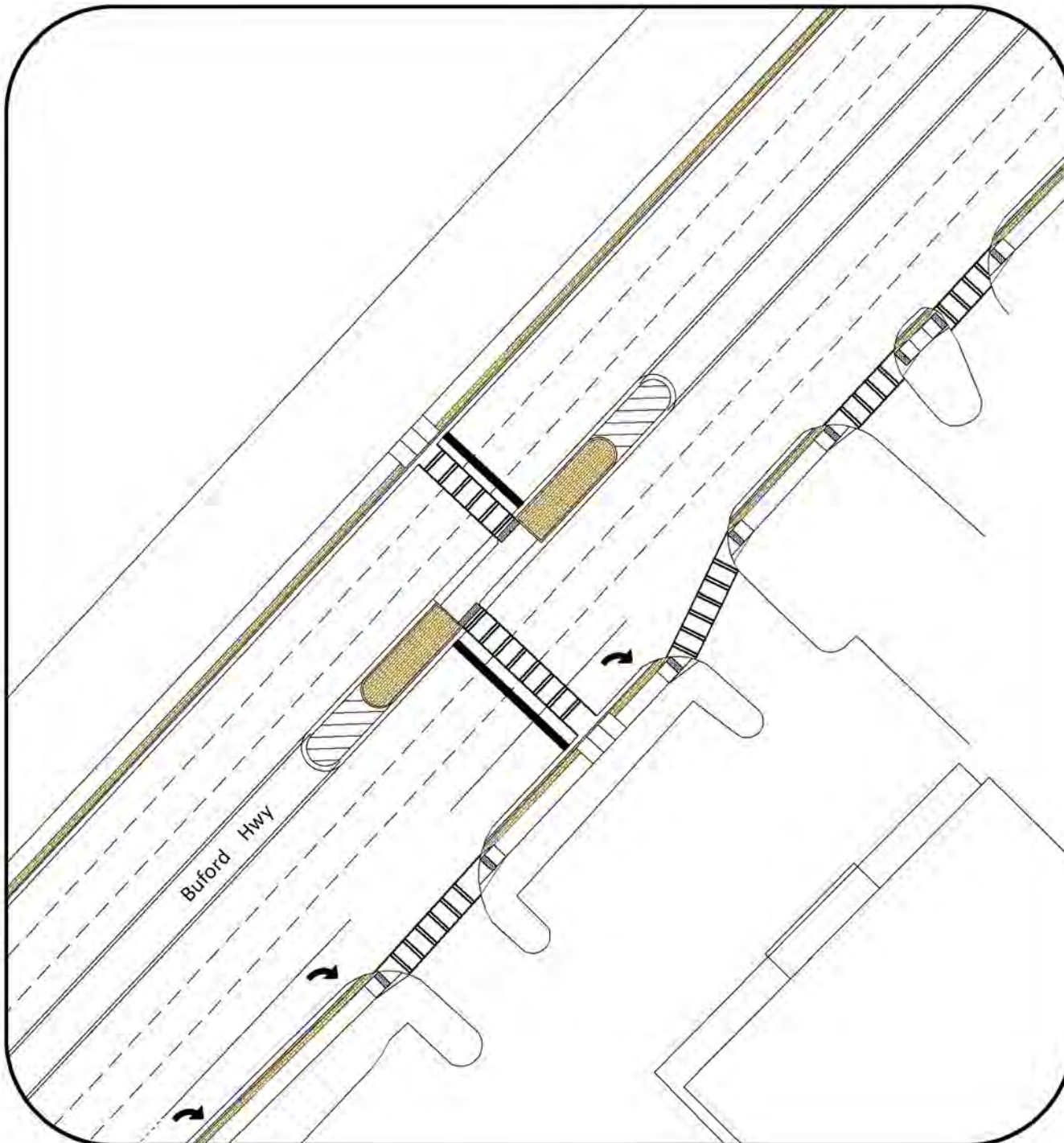
- Sketch of the present intersection.
- Sketch of the proposed intersection.
- Traffic Count Summary Sheets.
- Collision Diagram.



Buford Hwy Pedestrian Safety Project
P.I. #0009400
DeKalb County, Georgia
SR 13, from Afton Ln to Shallowford Ter, Phase II

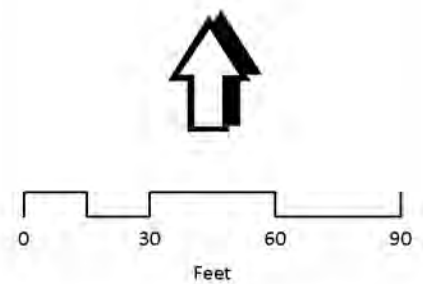
Existing Conditions





Buford Hwy Pedestrian Safety Project
P.I. #0009400
DeKalb County, Georgia
SR 13, from Afton Ln to Shallowford Ter, Phase II

Build Conditions



Atkins

Twenty-Four Hour Traffic Count

Location: Buford Hwy, south of Oak Shadow Drive (9060)

Hour Ending	1st		2nd		3rd		4th		Total		TOTAL
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound	
1:00 AM	39	40	32	25	35	26	30	15	136	106	242
2:00 AM	18	17	22	24	26	13	19	14	85	68	153
3:00 AM	12	21	20	10	14	10	21	7	67	48	115
4:00 AM	17	16	21	11	26	10	30	10	94	47	141
5:00 AM	31	5	66	14	54	15	43	11	194	45	239
6:00 AM	17	21	20	23	44	21	45	30	126	95	221
7:00 AM	43	50	63	58	71	76	70	87	247	271	518
8:00 AM	79	119	86	113	110	176	123	190	398	598	996
9:00 AM	117	235	118	226	128	225	107	194	470	880	1,350
10:00 AM	107	189	93	153	92	169	136	137	428	648	1,076
11:00 AM	114	129	99	129	124	119	119	116	456	493	949
12:00 PM	128	143	138	146	151	166	191	160	608	615	1,223
1:00 PM	188	171	197	176	189	185	206	195	780	727	1,507
2:00 PM	241	165	172	175	191	189	201	166	805	695	1,500
3:00 PM	215	152	184	175	189	177	198	178	786	682	1,468
4:00 PM	211	149	218	180	232	183	215	158	876	670	1,546
5:00 PM	250	182	263	210	270	196	260	218	1,043	806	1,849
6:00 PM	309	208	314	207	300	235	308	199	1,231	849	2,080
7:00 PM	307	214	279	202	234	194	231	197	1,051	807	1,858
8:00 PM	203	167	196	153	194	161	199	146	792	627	1,419
9:00 PM	209	141	182	111	185	122	171	101	747	475	1,222
10:00 PM	146	97	93	83	101	69	97	63	437	312	749
11:00 PM	86	74	77	64	75	48	78	51	316	237	553
12:00 AM	57	49	57	40	49	27	35	45	198	161	359
Total	3,144	2,754	3,010	2,708	3,084	2,812	3,133	2,688	12,371	10,962	23,333

Twenty-Four Hour Volume:

23,333 Vehicles Per Day

A.M. Peak Hour Is From
Volume of **1,362** Is

7:45 AM TO **8:45 AM**
5.8% Of 24-Hour Volume

P.M. Peak Hour Is From
Volume of **2,084** Is

5:15 PM TO **6:15 PM**
8.9% Of 24-Hour Volume

	% Northbound	% Southbound
AM Directional Distribution	36%	64%
PM Directional Distribution	59%	41%

Machine Count Made By:

Southern Traffic Services

Day-of-Week of Count:

Tuesday

Date of Count:

25-Mar-14

Report Prepared By:

JRA

Date Report Prepared:

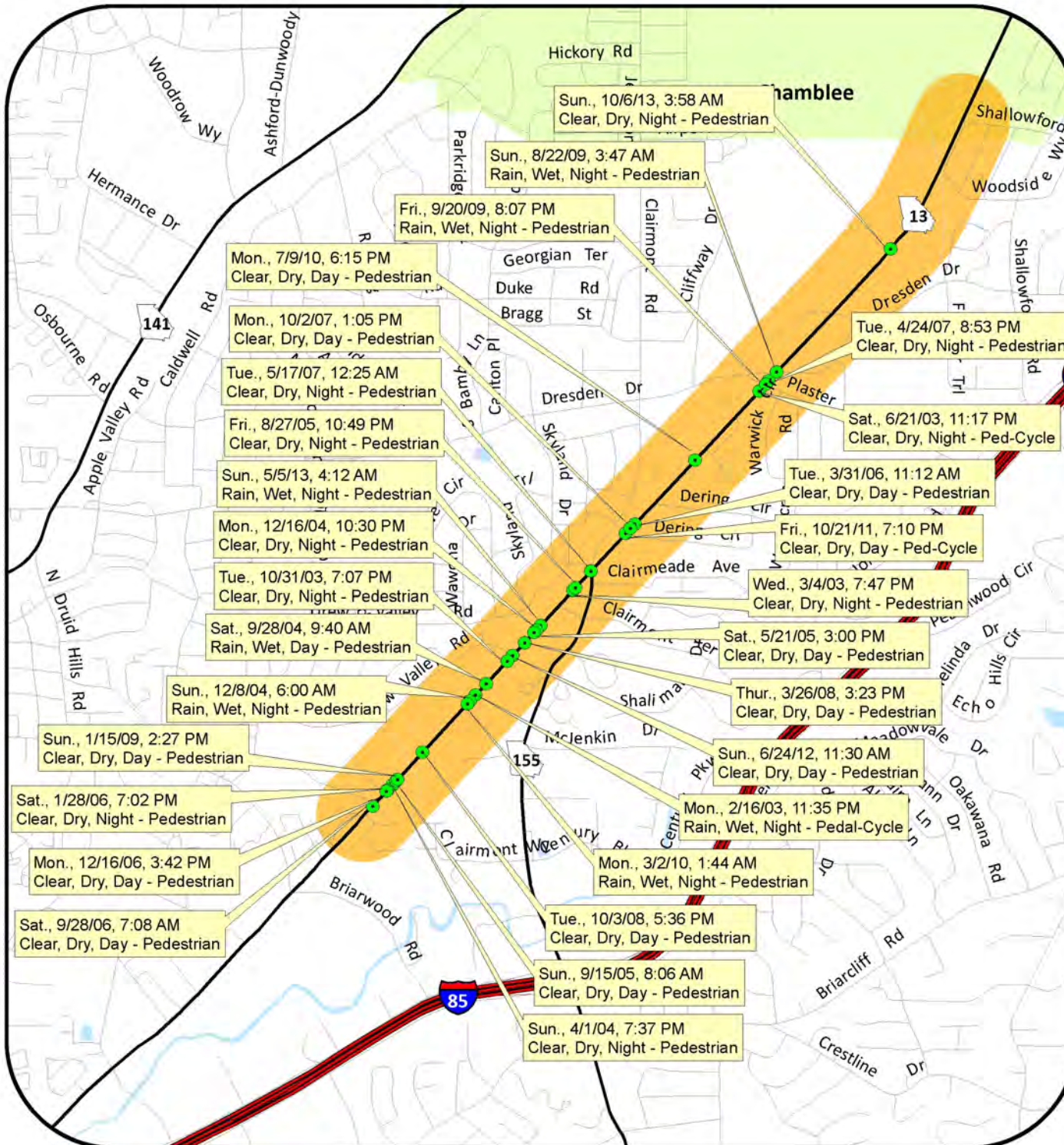
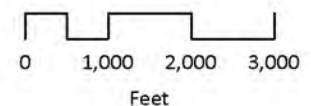
16-Dec-14

Buford Hwy Pedestrian Safety Project
P.I. #0009400
DeKalb County, Georgia
SR 13, from Afton Ln to Shallowford Ter, Phase II

Accident Diagram
Pedestrian Collision Locations

Legend

-  Bicycle/Pedestrian Collisions
-  Study Area
-  Interstate
-  State Highway
-  Local Roadway
-  Ramp
-  Lake/Pond
-  Stream



ATTACHMENT 8

Lighting Support Letters

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INDICATION OF LIGHTING SUPPORT
STREETSCAPE/ENHANCEMENT PROJECT

Georgia Department of Transportation
ATTN: Scott MacLean, Lead Design Engineer
Office of Design Policy & Support, 26th Floor
600 West Peachtree Street, NW
Atlanta, GA 30308

Location

The City of Brookhaven supports the consideration of streetscape/enhancement lighting.

Description: US 23/SR 13 Buford Highway from Afton Lane to Shallowford Terrace - Ph. II

State/County Route Numbers: (see above)

Project: CSSTP-0009-00(400) DeKalb County ~ P.I. No. 0009400

Associated Conditions

The undersigned agrees to participate in the following maintenance of installed streetscape/enhancement lighting:

- The full and entire cost to energize the lighting system installed *within the City limits of Brookhaven* and to provide for the operation/maintenance thereof.

We agree to participate in a formal *Local Government Lighting Project Agreement* during the preliminary design phase. This indication of support is submitted and all the conditions are hereby agreed to. The undersigned are duly authorized to execute this agreement.

Attest:

Susan Kloth
City Clerk

this 28th day of May, 2015

By:

Title:

Mayor
City Manager

Received

Office of Design Policy & Support
Friday, June 5th 2015

Scott A. MacLean

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INDICATION OF LIGHTING SUPPORT
STREETSCAPE/ENHANCEMENT PROJECT

Georgia Department of Transportation
ATTN: Scott MacLean, Lead Design Engineer
Office of Design Policy & Support, 26th Floor
600 West Peachtree Street, NW
Atlanta, GA 30308

Location

The City of Chamblee supports the consideration of streetscape/enhancement lighting.

Description: US 23/SR 13 Buford Highway from Afton Lane to Shallowford Terrace - Ph. II

State/County Route Numbers: (see above)

Project: CSSTP-0009-00(400) DeKalb County ~ P.I. No. 0009400

Associated Conditions

The undersigned agrees to participate in the following maintenance of installed streetscape/enhancement lighting:

- The full and entire cost to energize the lighting system installed *within the City limits of Chamblee* and to provide for the operation/maintenance thereof.

We agree to participate in a formal *Local Government Lighting Project Agreement* during the preliminary design phase. This indication of support is submitted and all the conditions are hereby agreed to. The undersigned are duly authorized to execute this agreement.

Attest:

Emmie D. Nutter
City Clerk

this 20 day of February, 2015

By: RM Johnson

Title: City Manager

Received

Office of Design Policy & Support
Thursday, February 26, 2015

Scott A. MacLean

ATTACHMENT 9

S I & A Reports

Bridge Inventory Data Listing



Parameters: Bridge Serial Num

Structure ID:089-0021-0

DeKalb

SUFF. RATING: 75.90

Location & Geography

Structure ID: 089-0021-0
200 Bridge Information: 07
***6A Feature Int:** N FORK P'TREE CREEK TRIB
***6B Critical Bridge:**
***7A Route No Carried:** SR00013
***7B Facility Carried:** BUFORD HIGHWAY
9 Location: 5.6 MI N OF DECATUR
2 Dot District: 4841700000 - D7 District Seven Chamblee
207 Year Photo: 2012
***91 Inspection Frequency:** 24 Date: 07/17/2014
92A Fract Crit Insp Freq: 0 Date: 02/01/1901
92B Underwater Insp Freq: 00 Date: 02/01/1901
92C Other Spc. Insp Freq: 00 Date: 02/01/1901
*** 4 Place Code:** 00000
***5 Inventory Route(O/U):** 1
Type: 3 - State
Designation: 1- Mainline
Number: 00013
Direction: 0. Not applicable
***16 Latitude:** 33.0000- 50.9720 HMMS Prefix:SR
***17 Longitude:** 84.0000- 19.2843 HMMS Suffix:00
MP: 2.22
98 Border Bridge: % Shared:00
99 ID Number: 0000000000000000
***100 STRAHNET:** 0- The Feature is not a STRAHNET route.
12 Base Highway Network: 1
13A LRS Inventory Route: 891001300
13B Sub Inventory Route: 0.00
***101 Parallel Structure:** N. No parallel structure exists
***102 Direction of Traffic:** 2- Two Way
***264 Road Inventory Mile Post:** 002.22
***208 Inspection Area:** Area 07 Initials: JPD
Engineer's Initials: gmc
*** Location ID No:** 089-00013D-002.22N

***104 Highway System:** 1-Inventory Route is on the NHS
***26 Functional Classification:** 14- Urban - Other Principal Arterial
***204 Federal Route Type:** F - Primary. No: 00131
105 Federal Lands Highway: 0. Not applicable
***110 Truck Route:** 0
206 School Bus Route: 1
217 Benchmark Elevation: 0000.00
218 Datum: 0- Not Applicable
***19 Bypass Length:** 1
***20 Toll:** 3- On a Free Road or Non-Highway
***21 Maintanance:** 01-State Highway Agency.
***22 Owner:** 01-State Highway Agency.
***31 Design Load:** 2- H 15
37 Historical Significance: 5- Not eligible for the National Register of Historic Places
205 Congressional District: 4 - FOUR
27 Year Constructed: 1935
106 Year Reconstructed: 1971
33 Bridge Median: 0-None
34 Skew: 99
35 Structure Flared: No
38 Navigation Control: 0- Navigation is not controlled by an Agency
213 Special Steel Design: 0- Not applicable or other
267 Type of Paint: 0- Not Applicable.
***42 Type of Service On:** 1-Highway
Type of Service Under: 5-Waterway
214 Movable Bridge: 0
203 Type Bridge: Q - Reinf - - -
259 Pile Encasement 3
***43 Structure Type Main:** 1-Concrete 19- Culvert
45 No.Spans Main: 2
44 Structure Type Appr: 0- Other 0- Other
46 No Spans Appr: 0
226 Bridge Curve Horiz 0 Vert: 0.00
111 Pier Protection N - Navigation Control item coded 0, or Feature not a waterway
107 Deck Structure Type: N - None
108 Wearing Structure Type: N. Not applicable
Membrane Type: N. Not applicable
Deck Protection: N. Not applicable

Signs & Attachments

225 Expansion Joint Type: 00- No expansion joint.
242 Deck Drains: 0- None.
243 Parapet Location: 0- None present.
Height: 0.00
Width: 0.00
238 Curb Height: 0
Curb Material: 0- None.
239 Handrail 0- None. 0- None.
***240 Median Barrier Rail:** 0- None.
241 Bridge Median Height: 0
*** Bridge Median Width:** 0
230 Guardrail Loc. Dir. Rear: 6- Both sides, approach and continuous.
Fwrd: 6- Both sides, approach and continuous.
Oppo. Dir. Rear: 0- None.
Oppo. Fwrd: 0- None.
244 Aproach Slab 0- None.
224 Retaining Wall: 0- None.
233Posted Speed Limit: 45
236 Warning Sign: 0.00
234 Delineator: 0.00
235 Hazard Boards: 0
237 Utilities Gas: 00- Not Applicable
Water: 00- Not Applicable
Electric: 00- Not Applicable
Telephone: 00- Not Applicable
Sewer: 00- Not Applicable
247 Lighting Street: 0
Navigation: 0
Aerial: 0- Not :
***248 County Continuity No.:** 02

Bridge Inventory Data Listing



Parameters: Bridge Serial Num

Structure ID:089-0021-0

Programming Data			Measurements:					
201 Project No:	NR-S-534-A		*29 ADT	25600 Year:2011		65 Inventory Rating Method:	0-Field Eval and Documented Eng Judgement	
202 Plans Available:	0- No Plans Available.		109 %Trucks:	1		63 Operating Rating Method:	0-Field Eval and Documented Eng Judgement	
249 Prop Proj No:	000000000000000000000000		* 28 Lanes On:	7 Under:0		66 Inventory Type:	2 - HS loading. Rating: 27	
250 Approval Status:	0000		210 No. Tracks On:	00 Under:00		64 Operating Type:	2 - HS loading. Rating: 46	
251 PI Number:	0000000		* 48 Max. Span Length	10		231Calculated Loads:		
252 Contract Date:	02/01/1901		* 49 Structure Length:	23		H-Modified:	00	0
260 Seismic No:	00000		51 Br. Rwdy. Width	0.00		HS-Modified:	00	0
75 Type Work:	0- Not Applicable	0- Initial Inventory	52 Deck Width:	0.00		Type 3:	00	0
94 Bridge Imp. Cost:	\$212		* 47 Tot. Horiz. Cl:	78		Type 3s2:	00	0
95 Roadway Imp. Cost:	\$21		50 Curb / Sidewalk Width	0.00 / 0.00		Timber:	00	0
96 Total Imp Cost:	\$319		32 Approach Rdwy. Width	78		Piggyback:	00	0
76 Imp Length:	0		*229 Shoulder Width:			261 H Inventory Rating:	15	
97 Imp Year:	2013		Rear Lt:	1.50 Type:2 -	Rt:2	262 H Operating Rating	25	
114 Furure ADT:	38400	Year:2031	Fwd. Lt:	1.50 Type:2 -	Rt:2	67 Structural Evaluation:	6	
Hydraulic Data			Pavement Width:			58 Deck Condition:	N - Not Applicable	
215Waterway Data:			Rear:	75.50 Type: 2- Asphalt.		59 Superstructure Condition:	N - Not Applicable	
High Water Elev:	0000.0	Year:1900		75.50 Type: 2- Asphalt.		* 227 Collision Damage:		
Flood Elev:	0000.0	Freq:00	Intersaction Rear:	1	Fwd: 1	60A Substructure Condition:	N - Not Applicable	
Avg Streambed Elev:	0000.0		36Safety Features Br. Rail:	1- Meets current standards		60B Scour Condition:	6 - Satisfactory Condition	
Drainage Area:	00000		Transition:	1- Meets current standards		60C Underwater Condition	N - Not Applicable	
Area of Opening:	000200		App. G. Rail:	1- Meets current standards		71 Waterway Adequacy:	6-Equal to present minimum criteria.	
113 Scour Critical	8. Foundation stable for conditions; scour above footing		App. Rail End:	1- Meets current standards		61 Channel Protection Cond.:	8	
216 Water Depth:	01.6	Br.Height:09.3	53 Minimum Cl. Over:	99'99"		68 Deck Geometry:	N	
222 Slope Protection:	0		Under:	N- Feature not a highway or railroad. 0.00'0.00"		69 UnderClr. Horz/Vert:	N	
221Spur Dikes Rear	0	Fwd:0	*228 Minimum Vertical Cl			72 Appr. Alignment:	8-No reduction of vehicle operating speed required.	
219 Fender System	0- None.		Act. Odm Dir.:	99 ' 99"		62 Culvert:	7 - Good Condition	
220 Dolphin:			Oppo. Dir:	99' 99"		Posting Data		
223 Culvert Cover:	9		Posted Odm. Dir:	00' 00"		70 Bridge Posting Required	5. Equal to or above legal loads	
Type:	1- Concrete.		Oppo. Dir:	00'00 "		41 Struct Open, Posted, CL:	A. Open, no restriction	
No. Barrels:	2		55 Lateral Undercl. Rt:	N- Feature not a highway or railroad. 0.00		* 103 Temporary Structure:	0	
Width:	10.00	Height:10	56 Lateral Undercl. Lt:	0.00		232 Posted Loads		
Length:	115	Apron:0	*10 Max Min Vert Cl:	99' 99" Dir:0		H-Modified:	00	
*265 U/W Insp. Area	0	Diver:ZZZ	39 Nav Vert Cl:	000 Horiz:0		HS-Modified:	00	
*Location ID No:	089-00013D-002.22N		116 Nav Vert Cl Closed:	000		Type 3:	00	
			245 Deck Thickness Main	0.00		Type 3s2:	00	
			Deck Thick Approach:	0.00		Timber:	00	
			246 Overlay Thickness:	0.00		Piggyback	00	
			212 Year Last Painted:	Sup:0000 Sub:0000		253 Notification Date:	02/01/1901	
						258 Fed Notify Date:	02/01/1901	

Bridge Inventory Data Listing



Parameters: Bridge Serial Num

Structure ID:089-0247-0

DeKalb

SUFF. RATING: 76.20

Location & Geography

Structure ID: 089-0247-0

200 Bridge Information: 07

*6A Feature Int: N FORK P'TREE CREEK TRIB

*6B Critical Bridge:

*7A Route No Carried: SR00013

*7B Facility Carried: BUFORD HIGHWAY

9 Location: 1.3 MI S OF CHAMBLEE

2 Dot District: 4841700000 - D7 District Seven Chamblee

207 Year Photo: 2012

*91 Inspection Frequency: 24 Date: 09/10/2014

92A Fract Crit Insp Freq: 0 Date: 02/01/1901

92B Underwater Insp Freq: 00 Date: 02/01/1901

92C Other Spc. Insp Freq: 00 Date: 02/01/1901

* 4 Place Code: 00000

*5 Inventory Route(O/U): 1

Type: 3 - State

Designation: 1- Mainline

Number: 00013

Direction: 0. Not applicable

*16 Latitude: 33.0000- 52.5000 HMMS Prefix:SR

*17 Longitude: 84.0000- 17.6514 HMMS Suffix:00

MP: 4.61

98 Border Bridge: % Shared:00

99 ID Number: 0000000000000000

*100 STRAHNET: 0- The Feature is not a STRAHNET route.

12 Base Highway Network: 1

13A LRS Inventory Route: 891001300

13B Sub Inventory Route: 0.00

*101 Parallel Structure: N. No parallel structure exists

*102 Direction of Traffic: 2- Two Way

*264 Road Inventory Mile Post: 004.61

*208 Inspection Area: Area 07 Initials: JPD

Engineer's Initials: gmc

* Location ID No: 089-00013D-004.61N

*104 Highway System: 1-Inventory Route is on the NHS

*26 Functional Classification: 14- Urban - Other Principal Arterial

*204 Federal Route Type: F - Primary. No: 00131

105 Federal Lands Highway: 0. Not applicable

*110 Truck Route: 0

206 School Bus Route: 1

217 Benchmark Elevation: 0000.00

218 Datum: 0- Not Applicable

*19 Bypass Length: 1

*20 Toll: 3- On a Free Road or Non-Highway

*21 Maintenance: 01-State Highway Agency.

*22 Owner: 01-State Highway Agency.

*31 Design Load: 2- H 15

37 Historical Significance: 5- Not eligible for the National Register of Historic Places

205 Congressional District: 4 - FOUR

27 Year Constructed: 1935

106 Year Reconstructed: 1971

33 Bridge Median: 0-None

34 Skew: 99

35 Structure Flared: No

38 Navigation Control: 0- Navigation is not controlled by an Agency

213 Special Steel Design: 0- Not applicable or other

267 Type of Paint: 0- Not Applicable.

*42 Type of Service On: 1-Highway

Type of Service Under: 5-Waterway

214 Movable Bridge: 0

203 Type Bridge: Q - Reinf - - -

259 Pile Encasement 3

*43 Structure Type Main: 1-Concrete 19- Culvert

45 No.Spans Main: 2

44 Structure Type Appr: 0- Other 0- Other

46 No Spans Appr: 0

226 Bridge Curve Horiz 0 Vert: 0.00

111 Pier Protection N - Navigation Control item coded 0, or Feature not a waterway

107 Deck Structure Type: N - None

108 Wearing Structure Type: N. Not applicable

Membrane Type: N. Not applicable

Deck Protection: N. Not applicable

Signs & Attachments

225 Expansion Joint Type: 00- No expansion joint.

242 Deck Drains: 0- None.

243 Parapet Location: 0- None present.

Height: 0.00

Width: 0.00

238 Curb Height: 0

Curb Material: 0- None.

239 Handrail 0- None. 0- None.

*240 Median Barrier Rail: 0- None.

241 Bridge Median Height: 0

* Bridge Median Width: 0

230 Guardrail Loc. Dir. Rear: 0- None.

Fwd: 0- None.

Oppo. Dir. Rear: 0- None.

Oppo. Fwd: 0- None.

244 Approach Slab 0- None.

224 Retaining Wall: 0- None.

233Posted Speed Limit: 45

236 Warning Sign: 0.00

234 Delineator: 0.00

235 Hazard Boards: 0

237 Utilities Gas: 00- Not Applicable

Water: 00- Not Applicable

Electric: 00- Not Applicable

Telephone: 00- Not Applicable

Sewer: 00- Not Applicable

247 Lighting Street: 0

Navigation: 0

Aerial: 0- Not

*248 County Continuity No.: 02

Bridge Inventory Data Listing



Parameters: Bridge Serial Num

Structure ID:089-0247-0

Programming Data			Measurements:					
201 Project No:	FAP NRS 534-A		*29 ADT	20730	Year:2011	65 Inventory Rating Method:	0-Field Eval and Documented Eng Judgement	
202 Plans Available:	0- No Plans Available.		109 %Trucks:	1		63 Operating Rating Method:	0-Field Eval and Documented Eng Judgement	
249 Prop Proj No:	000000000000000000000000		* 28 Lanes On:	7	Under:0	66 Inventory Type:	2 - HS loading. Rating: 27	
250 Approval Status:	0000		210 No. Tracks On:	00	Under:00	64 Operating Type:	2 - HS loading. Rating: 48	
251 PI Number:	0000000		* 48 Max. Span Length	22		231Calculated Loads:		
252 Contract Date:	02/01/1901		* 49 Structure Length:	45		H-Modified:	00	0
260 Seismic No:	00000		51 Br. Rwdy. Width	0.00		HS-Modified:	00	0
75 Type Work:	0- Not Applicable	0- Initial Inventory	52 Deck Width:	0.00		Type 3:	00	0
94 Bridge Imp. Cost:	\$416		* 47 Tot. Horiz. Cl:	80		Type 3s2:	00	0
95 Roadway Imp. Cost:	\$42		50 Curb / Sidewalk Width	0.00	/ 0.00	Timber:	00	0
96 Total Imp Cost:	\$623		32 Approach Rdwy. Width	80		Piggyback:	00	0
76 Imp Length:	0		*229 Shoulder Width:			261 H Inventory Rating:	15	
97 Imp Year:	2013		Rear Lt:	0.00	Type:2 - Rt:0	262 H Operating Rating	25	
114 Fureur ADT:	31095	Year:2031	Fwd. Lt:	0.00	Type:2 - Rt:0	67 Structural Evaluation:	6	
Hydraulic Data			Pavement Width:			58 Deck Condition:	N - Not Applicable	
215Waterway Data:			Rear:	80.00	Type: 2- Asphalt.	59 Superstructure Condition:	N - Not Applicable	
High Water Elev:	0000.0	Year:1900		80.00	Type: 2- Asphalt.	* 227 Collision Damage:		
Flood Elev:	0000.0	Freq:00	Intersection Rear:	1	Fwd: 1	60A Substructure Condition:	N - Not Applicable	
Avg Streambed Elev:	0000.0		36Safety Features Br. Rail:	N- Not applicable		60B Scour Condition:	6 - Satisfactory Condition	
Drainage Area:	00000		Transition:	N- Not applicable		60C Underwater Condition	N - Not Applicable	
Area of Opening:	000126		App. G. Rail:	N- Not applicable		71 Waterway Adequacy:	6-Equal to present minimum criteria.	
113 Scour Critical	8. Foundation stable for conditions; scour above footing		App. Rail End:	N- Not applicable		61 Channel Protection Cond.:	7	
216 Water Depth:	03.2	Br.Height:06.8	53 Minimum Cl. Over:	99'99"		68 Deck Geometry:	N	
222 Slope Protection:	0		Under:	N- Feature not a highway or railroad.	0.00'0.00"	69 UnderClr. Horz/Vert:	N	
221Spur Dikes Rear	0	Fwd:0	*228 Minimum Vertical Cl			72 Appr. Alignment:	8-No reduction of vehicle operating speed required.	
219 Fender System	0- None.		Act. Odm Dir:.	99 ' 99"		62 Culvert:	6 - Satisfactory Condition	
220 Dolphin:			Oppo. Dir:	99' 99"		Posting Data		
223 Culvert Cover:	4		Posted Odm. Dir:	00' 00"		70 Bridge Posting Required	5. Equal to or above legal loads	
Type:	1- Concrete.		Oppo. Dir:	00'00 "		41 Struct Open, Posted, CL:	A. Open, no restriction	
No. Barrels:	2		55 Lateral Undercl. Rt:	N- Feature not a highway or railroad.	0.00	* 103 Temporary Structure:	0	
Width:	9.00	Height:7	56 Lateral Undercl. Lt:	0.00		232 Posted Loads		
Length:	204	Apron:0	*10 Max Min Vert Cl:	99' 99" Dir:0		H-Modified:	00	
*265 U/W Insp. Area	0	Diver:ZZZ	39 Nav Vert Cl:	000 Horiz:0		HS-Modified:	00	
*Location ID No:	089-00013D-004.61N		116 Nav Vert Cl Closed:	000		Type 3:	00	
			245 Deck Thickness Main	0.00		Type 3s2:	00	
			Deck Thick Approach:	0.00		Timber:	00	
			246 Overlay Thickness:	0.00		Piggyback	00	
			212 Year Last Painted:	Sup:0000 Sub:0000		253 Notification Date:	02/01/1901	
						258 Fed Notify Date:	02/01/1901	

ATTACHMENT 10

Concept MS4 Compliance Report

**SR 13 – Buford Highway from
Afton Lane to Shallowford Terrace
P.I. No. 0009400
DeKalb County, GA**

CONCEPT MS4 COMPLIANCE REPORT

Prepared By



1600 RiverEdge Parkway, NW, Suite 600
Atlanta, Georgia 30328
(770) 933-0280
Contact: Nikki Reutlinger, PE
Kathy McCabe, PE
Atkins Project No.: 100046713

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I. Introduction

The SR 13/Buford Hwy from Afton Lane to Shallowford Terrace project includes sidewalk and pedestrian crossing improvements along approximately 2.6 miles of Buford Highway. The project is located in DeKalb County and consists of approximately 9 acres of disturbed area. The project will include the addition of approximately 3.5 acres of impervious area to construct the proposed improvements. Stormwater management design requirements for the project include compliance with the Georgia EPD General NPDES Stormwater Permit No. GAR041000 for Stormwater Discharges Associated with the Georgia Department of Transportation (GDOT) Municipal Separate Storm Sewer System (MS4). Section 4.2.5 of the GDOT MS4 permit requires projects to provide post-construction stormwater management by considering the following minimum standards, when feasible:

- 1) Stormwater Runoff Quality/Reduction;
- 2) Stream Channel/Aquatic Resource protection;
- 3) Overbank Flood Protection; and
- 4) Extreme Flood Protection

II. Method of Analysis

Outfall Level Exclusions:

Each project outfall has been analyzed to determine whether any Outfall Level Exclusions (OLE) apply that prevent the construction of a stormwater management BMP. The following 6 OLEs were considered for each outfall:

- 1) Change in existing roadway alignment that would create a safety concern
- 2) Installation of BMP causes re-alignment or piping of a stream
- 3) Installation of BMP impacts a stream buffer or wetland
- 4) Discharges exit R/W as sheet flow
- 5) Flows that originate offsite
- 6) Reduction (or negligible increase) in impervious area

Infeasibility Criteria:

Project outfalls that did not have OLEs were further evaluated to determine the feasibility of providing BMPs for post-construction stormwater management. The following 10 infeasibility criteria were considered for each outfall:

- 1) BMP cost that is greater than 10% of the project cost for that basin (include ROW cost, roadway construction, utility relocation, BMP construction, etc.)
- 2) Schedule delay (>90 days)
- 3) Impact to endangered or threatened species
- 4) Cultural or community resource damage (historical sites, archeological sites, cemetery, park, wildlife refuge, nature trail, or school)
- 5) Residence or business displacement
- 6) Violation of federal or state law or regulation
- 7) Site limitations, such as shallow Bedrock, contaminated soils, high groundwater, and potential utilities or underground facilities.
- 8) Soil infiltration capacity is limited
- 9) Site is too small to infiltrate a significant volume
- 10) Site does not allow for gravity flow to the BMP

Limited information is available for analysis of the OLE and Infeasibility criteria during the concept phase. Detailed survey and environmental assessments have not yet been completed for the project site; therefore, not all criteria can be fully evaluated at the concept phase.

For drainage basins where post-construction BMPs were found to be potentially feasible, analysis of the four minimum post-construction stormwater management standards utilized procedures established in the *Georgia Stormwater Management Manual*, Volume 2, First Edition, August 2001 (GSMM). The SCS Method was used to estimate the runoff due to rainfall for pre- and post-construction conditions based on the SCS 24 hour duration storm, and Type II rainfall with rainfall data for Atlanta, found in Table A-2 of the GSMM.

III. Project Outfall Summary

The proposed project is located in a densely developed corridor along Buford Highway. Drainage from the existing roadway is collected by curb and gutter which discharges to catch basins and closed pipe systems within the right-of-way. There are a total of 18 stormwater outfalls where runoff from the project site leaves the right-of-way either via a closed pipe system, or at a headwall outlet into a drainage channel. Potential OLEs and Infeasibility were evaluated for each outfall and locations were identified where stormwater BMPs may be feasible. Given that runoff from most of the project site is collected in closed pipe system, it is likely that gravity flow will not be achievable to proposed BMPs in many areas due to the depth of the pipe systems. This will be verified once additional survey information is available confirming pipe inverts and connectivity. In addition, it is anticipated that some outfalls may be located at or near buffered streams, which will limit the available area for proposed BMPs. This will be verified once stream delineations are completed for the project.

Potential feasible BMPs were identified for three of the project outfalls. NRCS Web Soil Survey maps identify soils in the project corridor as mostly Urban Land (Ud). Soil types including Appling, Cecil, Pacolet, and Toccoa were identified at or near the project limits. These soils are primarily within hydrologic soil group 'B', indicating a moderate infiltration potential. Therefore, it was assumed that infiltration BMPs may be feasible for the project, contingent upon in-field testing to confirm infiltration rates at proposed BMP locations.

Table 1 below summarizes the project outfalls and potential OLEs, Infeasibility Criteria, and BMPs that have been identified for each outfall.

Table 1: Project Outfall Summary

Outfall ID		Station / Offset	Potential OLE	Potential Infeasibility	Potential BMP	Comments
1	1A	138+00, 42' RT	3	10	None	Located at downstream end of culvert
	1B	138+11, 43' LT	3	10	None	Located at upstream end of culvert
2		142+37, 43' LT	3	1 & 10	Enhanced Swale	Need to confirm stream buffers and pipe inverts to verify gravity flow. The BMP will require additional ROW
3		150+29, 43' LT	3	7	None	Steep slopes limit available area for BMP
4		155+23, 57' LT	5	None	None	No roadway drainage to this outfall; all flows originate offsite
5		157+77, 43' LT	None	10	None	Need to confirm downstream pipe connectivity
6		161+33, 43' LT	3	1 & 7	None	Steep slopes limit available area for BMP
7		164+42, 57' LT	None	10	None	Need to confirm downstream pipe connectivity
8		172+80, 43' LT	3	1 & 7	None	Steep slopes limit available area for BMP
9		186+57, 42' RT	None	10	None	Need to confirm downstream pipe connectivity
10		204+09, 61' RT	None	10	None	Need to confirm downstream pipe connectivity
11		207+85, 42' RT	3	1 & 10	Bio-Retention	Need to confirm stream buffers and pipe inverts to verify gravity flow. The BMP will require additional ROW
12		220+90, 42' RT	None	10	None	Need to confirm downstream pipe connectivity
13	13A	238+99, 43' LT	3	10	None	Located at upstream end of culvert
	13B	239+08, 43' RT	None	10	None	Located at downstream end of culvert
14	14A	241+84, 43' LT	3	10	None	Located at upstream end of culvert
	14B	241+90, 43' RT	None	10	None	Located at downstream end of culvert
15		246+35, 42' RT	None	10	None	Need to confirm downstream pipe connectivity
16	16A	262+66, 72' LT	None	7	Bio-Retention	Need to confirm underground utility locations/conflicts. The BMP will require additional ROW
	16B	264+42, 42' LT	3	7	Bio-Retention	Need to confirm stream buffers and underground utility locations/conflicts. The BMP will require additional ROW
	16C	262+02, 42' RT	3	10	None	Located at downstream end of culvert
	16D	263+28, 62' RT	3	10	None	Located at downstream end of culvert
17		269+28, 43' LT	6	10	None	Negligible increase in impervious area
18		272+27, 47' RT	6	10	None	Negligible increase in impervious area

IV. Post-Construction Stormwater Management

As noted above, a conceptual study of the site found a total of four locations where BMPs may be feasible for post-construction stormwater management. The drainage areas to each of these outfalls was studied further to determine the stormwater treatment volumes required to meet water quality, channel protection, and flood protection requirements. Table 2 below summarizes the water quality and channel protection volumes as well as the pre- and post-developed flow rates for each of the studied outfalls. Refer to Appendix A for calculations.

Table 2: Stormwater Management Requirements at Feasible Outfalls

Outfall	Water Quality Volume	Channel Protection Volume	Overbank Flood Protection (25-yr Storm Event)	
			Pre	Post
2	285 cf	12,756 cf	15.83 cfs	17.82 cfs
11	1,059 cf	15,423 cf	20.89 cfs	22.65 cfs
16A	270 cf	15,416 cf	19.42 cfs	20.90 cfs
16B	163 cf	5,372 cf	6.71 cfs	7.18 cfs

Drainage Area #2

Outfall #2 is a 24" RCP pipe located at approximate station 142+40 left. The drainage area to Outfall #2 includes approximately 800 feet of Buford Highway that is collected in catch basins and piped to Outfall #2. Runoff leaves the right-of-way in a closed pipe system. Additional survey information is required to determine pipe connectivity downstream of the project site.

Within Drainage Area #2, the southbound lanes of Buford Highway are collected in an underground pipe system with no way to gravity flow to a BMP. However, it may be feasible to capture runoff from a portion of the northbound lanes and discharge to a proposed enhanced swale located in an existing low area on the southeast side of Buford Highway, in front of the Royale Apartments. An additional catch basin and piping will be required to collect and discharge runoff from the roadway to the enhanced swale. Additional right-of-way will be required for construction of the enhanced swale. Limited space is available for construction of the proposed BMP without impacting the existing apartment buildings. Therefore, the BMP is sized for treatment of the water quality volume only.

Drainage Area #11

Outfall #11 is a pipe of unknown size located at approximate station 207+90 right. The drainage area to Outfall #11 includes approximately 750 feet of the northbound lanes and 1,200 feet of the southbound lanes of Buford Highway that is collected in catch basins and piped to Outfall #11. Runoff leaves the right-of-way in a closed pipe system. Additional survey information is required to determine pipe connectivity downstream of the project site.

Within Drainage Area #11, the southbound lanes of Buford Highway are collected in an underground pipe system with no way to gravity flow to a BMP. However, it may be feasible to capture runoff from the northbound lanes and discharge to a proposed bio-retention basin located in an existing low area on the southeast side of Buford Highway adjacent to Oak Shadow Drive. An additional catch basin and piping will be required to collect and discharge runoff from the roadway to the bio-retention basin. Additional right-of-way will be required for construction of the basin. Limited space is available for construction of the proposed BMP without impacting

adjacent development. Therefore, it is not feasible to size the BMP to provide the required channel protection storage volume. However, given that stormwater outfalls from the site in a closed pipe conveyance system, it may be possible to waive channel protection requirements for this drainage basin. Additional survey information is required to confirm downstream pipe connectivity. The proposed conceptual BMP is sized for treatment of the water quality volume and may also provide minor control of post-developed flow rates for flood protection.

Drainage Area #16A

Outfall #16A is an 18" RCP culvert under a driveway located at approximate station 262+50 left. The drainage area to Outfall #16A includes approximately 1,250 feet of the southbound lanes of Buford Highway that is collected in a catch basin and piped to an existing ditch along the west side of Buford Highway.

It is likely not feasible to gravity flow the existing catch basin outfall to a BMP. However, it may be feasible to capture runoff from a portion of the drainage area in a flume and discharge to a proposed bio-retention basin located in a notch-out in the existing right-of-way on the west side of Buford Highway adjacent to a driveway onto the airport property. Additional right-of-way may be required for construction of the basin. Limited space is available for construction of the proposed BMP due to adjacent steep slopes and the requirement to maintain a drainage channel to bypass offsite flows. Therefore, it is not feasible to size the BMP to provide the required channel protection storage volume and the proposed conceptual BMP is sized for treatment of the water quality volume only.

Drainage Area #16B

Outfall #16B is a pipe outfall from a catch basin located at approximate station 264+50 left. The drainage area to Outfall #16B includes approximately 500 feet of the southbound lanes of Buford Highway that is collected in the catch basin and piped to a channel on the west side of Buford Highway, at the upstream end of an existing culvert under Buford Highway.

It is not feasible to gravity flow the existing catch basin outfall to a BMP. However, it may be feasible to capture runoff from a portion of the drainage area in a flume and discharge to a proposed bio-retention basin located on the west side of Buford Highway just south of a driveway onto the Bellsouth property. Additional right-of-way will be required for construction of the basin. Limited space is available for construction of the proposed BMP due to the likely adjacent stream buffer. Therefore, it is not feasible to size the BMP to provide the required channel protection storage volume and the proposed conceptual BMP is sized for treatment of the water quality volume only.

V. Conclusions

The GDOT project to construct sidewalk and pedestrian crossings along Buford Highway between Afton lane and Shallowford Terrace in DeKalb County must comply with the GDOT MS4 permit and provide post-construction stormwater management to meet water quality, channel protection, overbank flood protection, and extreme flood protection standards where feasible. A review of the site to determine the feasibility of providing post-construction BMPs found four areas where it may be possible to construct BMPs for post-construction stormwater management. The remainder of the project site area has limiting factors such as stream buffers, steep slopes, underground utilities, and existing storm pipe networks that will not allow for gravity drainage to proposed BMPs that make it infeasible to provide post-construction BMPs for all project outfalls.

Post-Construction BMPs have been conceptually designed within the four available site areas to meet the GSMM water quality requirements. It is likely not feasible to meet channel protection, overbank flood protection, and extreme flood protection requirements in these areas due to site limitations and the cost of acquiring right-of-way or displacements that would be required to provide additional storage volume to meet channel protection and flood protection requirements.

APPENDIX A

(CALCULATIONS)

Stormwater Runoff Volume (V) and Flowrate (Q) Calculations

Drainage Area # **2**

Analysis uses the SCS Hydrologic Method, per GSWMM Technical Handbook, Vol.2, Section 2.1.5

		PRE		POST	
Total Onsite Area:	A =	1.79	ac	1.96	ac
1-yr., 24-hr. Rainfall (P₁):	Per GSWMM Table A-2 (Atlanta): (0.14 in./hr.)*(24 hr.) =	3.36	in	3.36	in
25-yr 24-hr. Rainfall (P₂₅):	Per GSWMM Table A-2 (Atlanta): (0.27 in./hr.)*(24 hr.) =	6.48	in	6.48	in
Curve Number (CN):	Impv. CN = 98	Impv. Area = 1.55	ac	1.77	ac
Per: GASWMM pp.2.1-22, Table 2.1.5-1	Perv. CN = 61	Perv. Area = 0.24	ac	0.19	ac
	Woods CN = 55	Woods Area = 0.00	ac	0.00	ac
	Weighted CN =	93		94	
Potential Maximum Soil Retention, in. (S):	S = (1000/CN _w) - 10 =	0.75	in	0.59	in
1-yr. Runoff Volume (V₁):	V ₁ = ((P ₁ -0.2S) ²)/(P ₁ +0.8S) =	2.60	in	2.74	in
25-yr. Runoff Volume (V₂₅):	V ₂₅ = ((P ₂₅ -0.2S) ²)/(P ₂₅ +0.8S) =	5.66	in	5.82	in
Time of Concentration (T_c):	T _c =	0.08	hrs	0.08	hrs
Initial abstraction, in. (I_a):	I _a = 0.2S (or refer to Table 2.1.5-3, pp. 2.1-29, GSWMM) =	0.150		0.118	
I_a/P:	I _a /P ₂ for 1-year storm =	0.045		0.035	
	I _a /P ₂₅ for 25-year storm =	0.023		0.018	
Unit Discharge (q_u):	q _u (1-year) =	1000	csn/in	1000	csn/in
(from GSWMM Figure 2.1.5-6, pp. 2.1-30)	q _u (25-year) =	1000	csn/in	1000	csn/in
Stormwater Flow Rate (Q):	Q ₁ = q _u * (A/640) * V ₁ =	7.28	cfs	8.40	cfs
	Q ₂₅ = q _u * (A/640) * V ₂₅ =	15.83	cfs	17.82	cfs
					Q > 2 cfs, CP Required = 12.6% Increase

Channel Protection Volume (CP_v) Calculations:

Drainage Area # **2**

Analysis uses the SCS Hydrologic Method, per GSWMM Technical Handbook, Vol.2, Section 2.1.5

		PRE		POST	
Total Onsite Area:	A =	1.79	ac	1.96	ac
1-yr., 24-hr. Rainfall (P₁):	Per GSWMM Table A-2 (Atlanta): (0.14 in./hr.)*(24 hr.) =	3.36	in	3.36	in
Curve Number, CN:	Per: GASWMM pp.2.1-22, Table 2.1.5-1: CN =	93		94	
Potential Maximum Soil Retention, in. (S):	S = (1000/CN _w) - 10 =	0.75	in	0.59	in
1-yr. Runoff Volume (Q₁ in.):	Q ₁ = ((P ₁ -0.2S) ²)/(P ₁ +0.8S) =	2.60	in	2.74	in
Time of Concentration (T_c):	T _c =	0.08	hrs	0.08	hrs
Initial abstraction, in. (I_a):	I _a = 0.2S (or refer to Table 2.1.5-3, pp. 2.1-29, GSWMM) =	0.150		0.118	
I_a/P:	I _a /P ₁ for 1-year storm =	0.045		0.035	
Unit Discharge (q_u):	(from GSWMM Figure 2.1.5-6, pp. 2.1-30) q _u =	1000	csn/in	1000	csn/in

Channel Protection Volume (CP_v):

Analysis uses the GSWMM Technical Handbook, Vol.2, Section 2.2.5

Knowing q_u (1-year) = 1000 csn/in. and T (extended detention time of 24-hrs.),

from GSWMM Figure 2.2.5-1 (pp. 2.2-10):

For a Type-II Rainfall Distribution:

	V _s /V _r = 0.682 - 1.43*(q _o /q _i) + 1.64*(q _o /q _i) ² - 0.804*(q _o /q _i) ³ =	0.654		0.654	
CP_v = V_s (required storage volume):	CP _v = ((V _s /V _r)*Q ₁ *A)/(12in./ft.) =	0.254	acre-feet	0.293	acre-feet
	CP _v =	11,065	cf	12,756	cf

Water Quality Volume (WQv) and Peak Flow (Qwq) Calculations

Drainage Area # **2**

Analysis uses the GSWMM Technical Handbook, Vol.2, Section 2.1.7

Water Quality Volume (WQv) Calculations:

Pre-Developed:

Total Site Area (A):	1.79	acres
Imperv. area (IA):	1.55	acres
Pervious area (PA):	0.24	acres
Rainfall (P):	1.2	inches
% Impervious:	86.6%	
Rv = 0.05 + 0.009(I) =	0.829	

Post-Developed:

Total Site Area (A):	1.96	acres
Imperv. area (IA):	1.77	acres
Pervious area (PA):	0.19	acres
Rainfall (P):	1.2	inches
% Impervious:	90.3%	
Rv = 0.05 + 0.009(I) =	0.863	

Water Quality Volume Rv:

$$WQ-Rv = \text{Post-Rv} - \text{Pre-Rv} = 0.033$$

Water Quality Volume (WQv):

$$WQ_v = ((1.2 \text{ in.}) * R_v * A) / (12 \text{ in./ft.}) = 0.007 \text{ acre ft.} = 285 \text{ cf}$$

Water Quality Peak Flow (Qwq) Calculations:

Water Quality Volume, in inches (WQ_{v,in}):

$$WQ_{v,in} = 1.2 * R_v = 0.040 \text{ inches}$$

Curve Number (CN):

$$CN = 1000 / [10 + 5P + 10WQ_{v,in} - 10(WQ_{v,in}^2 + 1.25WQ_{v,in}P)^{1/2}] = 71.9$$

Time of Concentration (Tc):

$$\text{(Estimated)} = 5.0 \text{ min. } T_c = 0.08 \text{ hrs}$$

Potential Maximum Soil Retention, in. (S):

$$S = (1000/CN_w) - 10 = 3.92 \text{ in}$$

Initial abstraction, in. (I_a):

$$I_a = 0.2S \text{ (or refer to Table 2.1.5-3, pp. 2.1-29, GSWMM)} = 0.783$$

I_a/P:

$$I_a/P \text{ for Water Quality Storm} = 0.653$$

Unit Discharge (q_u):

$$\text{(from GSWMM Figure 2.1.5-6, pp. 2.1-30)} q_u = 550 \text{ csm/in}$$

Water Quality Peak Flow (Qwq):

$$Qwq = q_u * A \text{ (square miles)} * WQ_{v,in} = 0.06 \text{ cfs}$$

Enhanced Swale Calculations

BMP # **2**

Per GDOT Drainage Manual Section 10.4.3

Area to BMP = **0.69** ac

Curve Number (CN): Impv. CN = 98 Impv. A = **0.27** ac
 Per: GASWMM pp.2.1-22, Table 2.1.5-1 Perv. CN = 61 Perv. A = **0.42** ac
 Woods CN = 55 Woods A = **0.00** ac
 Weighted CN = **75**

Potential Maximum Soil Retention, in. (S): $S = (1000/CN_w) - 10 =$ **3.25** in

25-yr 24-hr. Rainfall (P_{25}): Per GSWMM Table A-2 (Atlanta): $(0.27 \text{ in./hr.}) \times (24 \text{ hr.}) =$ **6.48** in

25-yr. Runoff Volume (V_{25}): $V_{25} = ((P_{25} - 0.2S)^2) / (P_{25} + 0.8S) =$ **3.74** in


Time of Concentration (T_c): $T_c =$ **0.08** hrs

Initial abstraction, in. (I_a): $I_a = 0.2S$ (or refer to Table 2.1.5-3, pp. 2.1-29, GSWMM) = **0.650**

I_a/P : I_a/P_{25} for 25-year storm = **0.100**

Unit Discharge (q_u): (from GSWMM Figure 2.1.5-6, pp. 2.1-30) q_u (25-year) = **1000** csm/in

Stormwater Flow Rate (Q): $Q_{25} = q_u \times (A/640) \times V_{25} =$ **4.04** cfs

Description:	Enhanced Swale					<div>Shape = Trapezoidal</div> <div>Top, T = 18 ft</div> <div></div> <div>Base, b = 6.0 ft</div> <div>Depth, d = 2.0 ft</div> <div>Side Slope, Z = 3 : 1</div>
Lining/Condition:	Dense Grass					
Mannings n:	n = 0.240					
Channel Slope:	S = 0.01 ft/ft					
Channel Velocity & Flow Rate Calculations*:						
Flow Depth	A (sf)	P (ft)	R (ft)	V (ft/s)	Q (cfs)	
(WQ) 0.100	0.63	6.63	0.09	0.13	0.08	
(Q ₂₅) 0.950	8.41	12.01	0.70	0.49	4.12	
Water Quality Flow Freeboard =			1.90	ft		
25-Yr Flow Freeboard =			1.05	ft		

Water Quality Volume (WQv) = **285** cf

Enhanced Swale Sizing:

Filter Media Depth (Df) = **2.5** ft
 Coefficient Of Permeability (k) = **1.5** ft/day (for typical filter media)
 Max. height of water above filter bed (Hmax) = **1.50** ft
 Avg. height of water above filter bed (Hf) = **0.75** ft (1/2 Hmax)
 Design Filter Bed Drain Time (Tf) = **2** days (48 hrs recommended max)

Required Surface Area of Filter Media: $A_f = [WQv \times Df] / [k(H_f + D_f)(T_f)] =$ **73** sf
 Bottom Width of Swale: W = **6.0** ft
 Length of Swale: L = **20** ft
 Actual Surface Area of Filter Media: Actual $A_f =$ **120** sf

Height of Overflow Weir (max 1.5 ft): Hw = **1.50** ft
 Swale Side Slopes (z:1) z = **3** ft
 Cross-Sectional Storage Area: As = **16** sf
 Required Swale Length (No Slope): $L = WQv / As =$ **18** ft
 Slope of Swale: S = **2.00%**
 Storage Volume at Overflow Weir Height: $V_s = L \times As =$ **315** cf

Stormwater Runoff Volume (V) and Flowrate (Q) Calculations

Drainage Area # **11**

Analysis uses the SCS Hydrologic Method, per GSWMM Technical Handbook, Vol.2, Section 2.1.5

Total Onsite Area:		A =	PRE	ac	POST	ac
			2.64		2.64	
1-yr., 24-hr. Rainfall (P ₁):	Per GSWMM Table A-2 (Atlanta): (0.14 in./hr.)*(24 hr.) =		3.36	in	3.36	in
25-yr 24-hr. Rainfall (P ₂₅):	Per GSWMM Table A-2 (Atlanta): (0.27 in./hr.)*(24 hr.) =		6.48	in	6.48	in
Curve Number (CN):	Impv. CN = 98	Impv. Area =	1.91	ac	2.18	ac
Per: GASWMM pp.2.1-22, Table 2.1.5-1	Perv. CN = 61	Perv. Area =	0.73	ac	0.46	ac
	Woods CN = 55	Woods Area =	0.00	ac	0.00	ac
		Weighted CN =	88		92	
Potential Maximum Soil Retention, in. (S):		S = (1000/CN _w) - 10 =	1.39	in	0.92	in
1-yr. Runoff Volume (V ₂):	V ₁ = ((P ₁ -0.2S) ²)/(P ₁ +0.8S) =		2.12	in	2.46	in
25-yr. Runoff Volume (V ₂₅):	V ₂₅ = ((P ₂₅ -0.2S) ²)/(P ₂₅ +0.8S) =		5.06	in	5.49	in
Time of Concentration (Tc):		Tc =	0.08	hrs	0.08	hrs
Initial abstraction, in. (I _a):	I _a = 0.2S (or refer to Table 2.1.5-3, pp. 2.1-29, GSWMM) =		0.279		0.185	
I _a /P:	I _a /P ₂ for 1-year storm =		0.083		0.055	
	I _a /P ₂₅ for 25-year storm =		0.043		0.028	
Unit Discharge (q _u):	q _u (1-year) =		1000	csm/in	1000	csm/in
(from GSWMM Figure 2.1.5-6, pp. 2.1-30)	q _u (25-year) =		1000	csm/in	1000	csm/in
Stormwater Flow Rate (Q):	Q ₁ = q _u * (A/640) * V ₁ =		8.75	cfs	10.15	cfs
	Q ₂₅ = q _u * (A/640) * V ₂₅ =		20.89	cfs	22.65	cfs
					Q > 2 cfs, CP Required	
					= 8.4% Increase	

Channel Protection Volume (CPv) Calculations:

Drainage Area # **11**

Analysis uses the SCS Hydrologic Method, per GSWMM Technical Handbook, Vol.2, Section 2.1.5

Total Onsite Area:		A =	PRE 2.64	ac	POST 2.64	ac
1-yr., 24-hr. Rainfall (P₁):	Per GSWMM Table A-2 (Atlanta): (0.14 in./hr.)*(24 hr.) =		3.36	in	3.36	in
Curve Number, CN:	Per: GASWMM pp.2.1-22, Table 2.1.5-1: CN =		88		92	
Potential Maximum Soil Retention, in. (S):		S = (1000/CN _w) - 10 =	1.39	in	0.92	in
1-yr. Runoff Volume (Q₁, in.):		Q ₁ = ((P ₁ -0.2S) ²)/(P ₁ +0.8S) =	2.12	in	2.46	in
Time of Concentration (Tc):		Tc =	0.08	hrs	0.08	hrs
Initial abstraction, in. (I_a):		I _a = 0.2S (or refer to Table 2.1.5-3, pp. 2.1-29, GSWMM) =	0.279		0.185	
I_a/P:		I _a /P ₁ for 1-year storm =	0.083		0.055	
Unit Discharge (q_u):		(from GSWMM Figure 2.1.5-6, pp. 2.1-30) q _u =	1000	csm/in	1000	csm/in

Channel Protection Volume (CP_v):

Analysis uses the GSWMM Technical Handbook, Vol.2, Section 2.2.5

Knowing q_u (1-year) = 1000 csm/in. and T (extended detention time of 24-hrs.),
 from GSWMM Figure 2.2.5-1 (pp. 2.2-10):

For a Type-II Rainfall Distribution:

		q _o /q _i =	0.020		0.020	
		V _s /V _r = 0.682 - 1.43*(q _o /q _i) + 1.64*(q _o /q _i) ² - 0.804*(q _o /q _i) ³ =	0.654		0.654	
CP_v = V_s (required storage volume):		CP _v = ((V _s /V _r)*Q ₁ *A)/(12in./ft.) =	0.305	acre-feet	0.354	acre-feet
		CP _v =	13,299	cf	15,423	cf

Water Quality Volume (WQv) and Peak Flow (Qwq) Calculations

Drainage Area # **11**

Analysis uses the GSWMM Technical Handbook, Vol.2, Section 2.1.7

Water Quality Volume (WQv) Calculations:

Pre-Developed:

Total Site Area (A):	2.64	acres
Imperv. area (IA):	1.91	acres
Pervious area (PA):	0.73	acres
Rainfall (P):	1.2	inches
% Impervious:	72.3%	
Rv = 0.05 + 0.009(I) =	0.701	

Post-Developed:

Total Site Area (A):	2.64	acres
Imperv. area (IA):	2.18	acres
Pervious area (PA):	0.46	acres
Rainfall (P):	1.2	inches
% Impervious:	82.6%	
Rv = 0.05 + 0.009(I) =	0.793	

Water Quality Volume Rv:

$$WQ-Rv = \text{Post-Rv} - \text{Pre-Rv} = 0.092$$

Water Quality Volume (WQv):

$$WQ_v = ((1.2 \text{ in.}) * R_v * A) / (12 \text{ in./ft.}) = 0.024 \text{ acre ft.} = 1,059 \text{ cf}$$

Water Quality Peak Flow (Qwq) Calculations:

Water Quality Volume, in inches (WQ_{v,in}):

$$WQ_{v,in} = 1.2 * R_v = 0.110 \text{ inches}$$

Curve Number (CN): CN = 1000/[10+5P+10WQ_{v,in}-10(WQ_{v,in}²+1.25WQ_{v,in}P)^{1/2}] = 77.6

Time of Concentration (Tc): (Estimated) = 5.0 min. Tc = 0.08 hrs

Potential Maximum Soil Retention, in. (S): S = (1000/CN_w) - 10 = 2.89 in

Initial abstraction, in. (I_a): I_a = 0.2S (or refer to Table 2.1.5-3, pp. 2.1-29, GSWMM) = 0.577

I_a/P: I_a/P for Water Quality Storm = 0.481

Unit Discharge (q_u): (from GSWMM Figure 2.1.5-6, pp. 2.1-30) q_u = 550 csm/in

Water Quality Peak Flow (Qwq): Qwq = q_u * A (square miles) * WQ_{v,in} = 0.25 cfs

Bioretention Calculations

BMP # 11

Per GDOT Drainage Manual Section 10.4.7

Area to BMP = 1.67 ac

Curve Number (CN):

Per: GASWMM pp.2.1-22, Table 2.1.5-1

Impv. CN = 98

Perv. CN = 61

Woods CN = 55

Impv. A = 0.85 ac

Perv. A = 0.82 ac

Woods A = 0.00 ac

Weighted CN = 80

Potential Maximum Soil Retention, in. (S):

$S = (1000/CN_w) - 10 = 2.53$ in

25-yr 24-hr. Rainfall (P_{25}):

Per GSWMM Table A-2 (Atlanta): $(0.27 \text{ in./hr.}) \times (24 \text{ hr.}) = 6.48$ in

25-yr. Runoff Volume (V_{25}):

$V_{25} = ((P_{25} - 0.2S)^2) / (P_{25} + 0.8S) = 4.20$ in

Time of Concentration (T_c):

$T_c = 0.08$ hrs

Initial abstraction, in. (I_a):

$I_a = 0.2S$ (or refer to Table 2.1.5-3, pp. 2.1-29, GSWMM) = 0.505

I_a/P :

I_a/P_{25} for 25-year storm = 0.078

Unit Discharge (q_u): (from GSWMM Figure 2.1.5-6, pp. 2.1-30)

q_u (25-year) = 1000 csm/in

Stormwater Flow Rate (Q):

$Q_{25} = q_u \times (A/640) \times V_{25} = 10.96$ cfs

Water Quality Volume (WQv) = 1,059 cf

Bioretention Basin Sizing:

Filter Media Depth (D_f) = 2 ft

Coefficient Of Permeability (k) = 3 ft/day (typically 2 to 4 ft/day)

Max. height of water above filter bed (H_{max}) = 0.75 ft

Avg. height of water above filter bed (H_f) = 0.38 ft (1/2 H_{max})

Design Filter Bed Drain Time (T_f) = 0.5 days (0.5 days recommended max)

Required Surface Area of Bioretention Basin:

$Ab = [WQv \times D_f] / [k(H_f + D_f)(T_f)] = 594$ sf

Available Area = 980 sf

Stormwater Runoff Volume (V) and Flowrate (Q) Calculations

Drainage Area # **16A**

Analysis uses the SCS Hydrologic Method, per GSWMM Technical Handbook, Vol.2, Section 2.1.5

Total Onsite Area:		A =	PRE	ac	POST	ac
			2.11		2.22	
1-yr., 24-hr. Rainfall (P ₁):	Per GSWMM Table A-2 (Atlanta): (0.14 in./hr.)*(24 hr.) =		3.36	in	3.36	in
25-yr 24-hr. Rainfall (P ₂₅):	Per GSWMM Table A-2 (Atlanta): (0.27 in./hr.)*(24 hr.) =		6.48	in	6.48	in
Curve Number (CN):	Impv. CN = 98	Impv. Area =	1.94	ac	2.11	ac
Per: GASWMM pp.2.1-22, Table 2.1.5-1	Perv. CN = 61	Perv. Area =	0.17	ac	0.11	ac
	Woods CN = 55	Woods Area =	0.00	ac	0.00	ac
		Weighted CN =	95		96	
Potential Maximum Soil Retention, in. (S):		S = (1000/CN _w) - 10 =	0.52	in	0.40	in
1-yr. Runoff Volume (V ₂):	V ₁ = ((P ₁ -0.2S) ²)/(P ₁ +0.8S) =		2.80	in	2.92	in
25-yr. Runoff Volume (V ₂₅):	V ₂₅ = ((P ₂₅ -0.2S) ²)/(P ₂₅ +0.8S) =		5.89	in	6.03	in
Time of Concentration (T _c):		T _c =	0.08	hrs	0.08	hrs
Initial abstraction, in. (I _a):	I _a = 0.2S (or refer to Table 2.1.5-3, pp. 2.1-29, GSWMM) =		0.105		0.080	
I _a /P:	I _a /P ₂ for 1-year storm =		0.031		0.024	
	I _a /P ₂₅ for 25-year storm =		0.016		0.012	
Unit Discharge (q _u):	q _u (1-year) =		1000	csm/in	1000	csm/in
(from GSWMM Figure 2.1.5-6, pp. 2.1-30)	q _u (25-year) =		1000	csm/in	1000	csm/in
Stormwater Flow Rate (Q):	Q ₁ = q _u * (A/640) * V ₁ =		9.24	cfs	10.15	cfs
	Q ₂₅ = q _u * (A/640) * V ₂₅ =		19.42	cfs	20.90	cfs
					Q > 2 cfs, CP Required	
					= 7.6% Increase	

Channel Protection Volume (CP_v) Calculations:

Drainage Area # **16A**

Analysis uses the SCS Hydrologic Method, per GSWMM Technical Handbook, Vol.2, Section 2.1.5

Total Onsite Area:		A =	PRE 2.11	ac	POST 2.22	ac
1-yr., 24-hr. Rainfall (P₁):	Per GSWMM Table A-2 (Atlanta): (0.14 in./hr.)*(24 hr.) =		3.36	in	3.36	in
Curve Number, CN:	Per: GASWMM pp.2.1-22, Table 2.1.5-1: CN =		95		96	
Potential Maximum Soil Retention, in. (S):		S = (1000/CN _w) - 10 =	0.52	in	0.40	in
1-yr. Runoff Volume (Q₁, in.):		Q ₁ = ((P ₁ -0.2S) ²)/(P ₁ +0.8S) =	2.80	in	2.92	in
Time of Concentration (T_c):		T _c =	0.08	hrs	0.08	hrs
Initial abstraction, in. (I_a):		I _a = 0.2S (or refer to Table 2.1.5-3, pp. 2.1-29, GSWMM) =	0.105		0.080	
I_a/P:		I _a /P ₁ for 1-year storm =	0.031		0.024	
Unit Discharge (q_u):		(from GSWMM Figure 2.1.5-6, pp. 2.1-30) q _u =	1000	csm/in	1000	csm/in

Channel Protection Volume (CP_v):

Analysis uses the GSWMM Technical Handbook, Vol.2, Section 2.2.5

Knowing q_u (1-year) = 1000 csm/in. and T (extended detention time of 24-hrs.),

from GSWMM Figure 2.2.5-1 (pp. 2.2-10):

For a Type-II Rainfall Distribution:

		q _o /q _i =	0.020		0.020	
	V _s /V _t = 0.682 - 1.43*(q _o /q _i) + 1.64*(q _o /q _i) ² - 0.804*(q _o /q _i) ³ =		0.654		0.654	
CP_v = V_s (required storage volume):		CP _v = ((V _s /V _t)*Q ₁ *A)/(12in./ft.) =	0.322	acre-feet	0.354	acre-feet
		CP _v =	14,045	cf	15,416	cf

Water Quality Volume (WQv) and Peak Flow (Qwq) Calculations

Drainage Area # **16A**

Analysis uses the GSWMM Technical Handbook, Vol.2, Section 2.1.7

Water Quality Volume (WQv) Calculations:

Pre-Developed:

Total Site Area (A):	2.11	acres
Imperv. area (IA):	1.94	acres
Pervious area (PA):	0.17	acres
Rainfall (P):	1.2	inches
% Impervious:	91.9%	
$R_v = 0.05 + 0.009(I) =$	0.877	

Post-Developed:

Total Site Area (A):	2.22	acres
Imperv. area (IA):	2.11	acres
Pervious area (PA):	0.11	acres
Rainfall (P):	1.2	inches
% Impervious:	95.0%	
$R_v = 0.05 + 0.009(I) =$	0.905	

Water Quality Volume R_v :

$$WQ-R_v = \text{Post-}R_v - \text{Pre-}R_v = 0.028$$

Water Quality Volume (WQ_v):

$$WQ_v = ((1.2 \text{ in.}) * R_v * A) / (12 \text{ in./ft.}) = 0.006 \text{ acre ft.} = 270 \text{ cf}$$

Water Quality Peak Flow (Qwq) Calculations:

Water Quality Volume, in inches ($WQ_{v,in}$):

$$WQ_{v,in} = 1.2 * R_v = 0.034 \text{ inches}$$

$$\text{Curve Number (CN): } CN = 1000 / [10 + 5P + 10WQ_{v,in} - 10(WQ_{v,in}^2 + 1.25WQ_{v,in}P)^{1/2}] = 71.1$$

$$\text{Time of Concentration (Tc): (Estimated) } = 5.0 \text{ min. } T_c = 0.08 \text{ hrs}$$

$$\text{Potential Maximum Soil Retention, in. (S): } S = (1000/CN_w) - 10 = 4.07 \text{ in}$$

$$\text{Initial abstraction, in. (I}_a\text{): } I_a = 0.2S \text{ (or refer to Table 2.1.5-3, pp. 2.1-29, GSWMM)} = 0.814$$

$$I_a/P: I_a/P \text{ for Water Quality Storm} = 0.678$$

$$\text{Unit Discharge (q}_u\text{): (from GSWMM Figure 2.1.5-6, pp. 2.1-30) } q_u = 550 \text{ csm/in}$$

$$\text{Water Quality Peak Flow (Qwq): } Qwq = q_u * A \text{ (square miles)} * WQ_{v,in} = 0.06 \text{ cfs}$$

Bioretention Calculations

BMP # 16A

Per GDOT Drainage Manual Section 10.4.7

Area to BMP = 1.38 ac

Curve Number (CN):

Per: GASWMM pp.2.1-22, Table 2.1.5-1

Impv. CN = 98

Perv. CN = 61

Woods CN = 55

Impv. A = 1.34 ac

Perv. A = 0.04 ac

Woods A = 0.00 ac

Weighted CN = 97

Potential Maximum Soil Retention, in. (S):

$S = (1000/CN_w) - 10 = 0.32$ in

25-yr 24-hr. Rainfall (P_{25}):

Per GSWMM Table A-2 (Atlanta): $(0.27 \text{ in./hr.}) \times (24 \text{ hr.}) = 6.48$ in

25-yr. Runoff Volume (V_{25}):

$V_{25} = ((P_{25} - 0.2S)^2) / (P_{25} + 0.8S) = 6.11$ in

Time of Concentration (T_c):

$T_c = 0.08$ hrs

Initial abstraction, in. (I_a):

$I_a = 0.2S$ (or refer to Table 2.1.5-3, pp. 2.1-29, GSWMM) = 0.063

I_a/P :

I_a/P_{25} for 25-year storm = 0.010

Unit Discharge (q_u): (from GSWMM Figure 2.1.5-6, pp. 2.1-30)

q_u (25-year) = 1000 csm/in

Stormwater Flow Rate (Q):

$Q_{25} = q_u \times (A/640) \times V_{25} = 13.18$ cfs

Water Quality Volume (WQv) = 270 cf

Bioretention Basin Sizing:

Filter Media Depth (D_f) = 2 ft

Coefficient Of Permeability (k) = 3 ft/day (typically 2 to 4 ft/day)

Max. height of water above filter bed (H_{max}) = 0.75 ft

Avg. height of water above filter bed (H_f) = 0.38 ft (1/2 H_{max})

Design Filter Bed Drain Time (T_f) = 0.5 days (0.5 days recommended max)

Required Surface Area of Bioretention Basin:

$Ab = [WQv \times D_f] / [k(H_f + D_f)(T_f)] = 152$ sf

Available Area = 248 sf

Stormwater Runoff Volume (V) and Flowrate (Q) Calculations

Drainage Area # **16B**

Analysis uses the SCS Hydrologic Method, per GSWMM Technical Handbook, Vol.2, Section 2.1.5

Total Onsite Area:		A =	PRE	ac	POST	ac
			0.73		0.75	
1-yr., 24-hr. Rainfall (P ₁):	Per GSWMM Table A-2 (Atlanta): (0.14 in./hr.)*(24 hr.) =	3.36	in		3.36	in
25-yr 24-hr. Rainfall (P ₂₅):	Per GSWMM Table A-2 (Atlanta): (0.27 in./hr.)*(24 hr.) =	6.48	in		6.48	in
Curve Number (CN):	Impv. CN = 98	Impv. Area =	0.67	ac	0.73	ac
Per: GASWMM pp.2.1-22, Table 2.1.5-1	Perv. CN = 61	Perv. Area =	0.06	ac	0.02	ac
	Woods CN = 55	Woods Area =	0.00	ac	0.00	ac
		Weighted CN =	95		97	
Potential Maximum Soil Retention, in. (S):		S = (1000/CN _w) - 10 =	0.53	in	0.31	in
1-yr. Runoff Volume (V ₂):	V ₁ = ((P ₁ -0.2S) ²)/(P ₁ +0.8S) =	2.80	in		3.02	in
25-yr. Runoff Volume (V ₂₅):	V ₂₅ = ((P ₂₅ -0.2S) ²)/(P ₂₅ +0.8S) =	5.88	in		6.12	in
Time of Concentration (T _c):		T _c =	0.08	hrs	0.08	hrs
Initial abstraction, in. (I _a):	I _a = 0.2S (or refer to Table 2.1.5-3, pp. 2.1-29, GSWMM) =	0.106			0.062	
I _a /P:	I _a /P ₂ for 1-year storm =	0.032			0.018	
	I _a /P ₂₅ for 25-year storm =	0.016			0.010	
Unit Discharge (q _u):	q _u (1-year) =	1000	csm/in		1000	csm/in
(from GSWMM Figure 2.1.5-6, pp. 2.1-30)	q _u (25-year) =	1000	csm/in		1000	csm/in
Stormwater Flow Rate (Q):	Q ₁ = q _u * (A/640) * V ₁ =	3.19	cfs		3.54	cfs
	Q ₂₅ = q _u * (A/640) * V ₂₅ =	6.71	cfs		7.18	cfs
		Q > 2 cfs, CP Required				
		= 6.9% Increase				

Channel Protection Volume (CP_v) Calculations:

Drainage Area # **16B**

Analysis uses the SCS Hydrologic Method, per GSWMM Technical Handbook, Vol.2, Section 2.1.5

Total Onsite Area:		A =	PRE 0.73	ac	POST 0.75	ac
1-yr., 24-hr. Rainfall (P₁):	Per GSWMM Table A-2 (Atlanta): (0.14 in./hr.)*(24 hr.) =		3.36	in	3.36	in
Curve Number, CN:	Per: GASWMM pp.2.1-22, Table 2.1.5-1: CN =		95		97	
Potential Maximum Soil Retention, in. (S):		S = (1000/CN _w) - 10 =	0.53	in	0.31	in
1-yr. Runoff Volume (Q₁, in.):		Q ₁ = ((P ₁ -0.2S) ²)/(P ₁ +0.8S) =	2.80	in	3.02	in
Time of Concentration (T_c):		T _c =	0.08	hrs	0.08	hrs
Initial abstraction, in. (I_a):		I _a = 0.2S (or refer to Table 2.1.5-3, pp. 2.1-29, GSWMM) =	0.106		0.062	
I_a/P:		I _a /P ₁ for 1-year storm =	0.032		0.018	
Unit Discharge (q_u):		(from GSWMM Figure 2.1.5-6, pp. 2.1-30) q _u =	1000	csn/in	1000	csn/in

Channel Protection Volume (CP_v):

Analysis uses the GSWMM Technical Handbook, Vol.2, Section 2.2.5

Knowing q_u (1-year) = 1000 csn/in. and T (extended detention time of 24-hrs.),

from GSWMM Figure 2.2.5-1 (pp. 2.2-10):

For a Type-II Rainfall Distribution:

V _s /V _r = 0.682 - 1.43*(q _o /q _i) + 1.64*(q _o /q _i) ² - 0.804*(q _o /q _i) ³ =		q _o /q _i =	0.020		0.020	
CP_v = V_s (required storage volume):		CP _v = ((V _s /V _r)*Q ₁ *A)/(12in./ft.) =	0.111	acre-feet	0.123	acre-feet
		CP _v =	4,848	cf	5,372	cf

Water Quality Volume (WQv) and Peak Flow (Qwq) Calculations

Drainage Area # **16B**

Analysis uses the GSWMM Technical Handbook, Vol.2, Section 2.1.7

Water Quality Volume (WQv) Calculations:

Pre-Developed:

Total Site Area (A):	0.73	acres
Imperv. area (IA):	0.67	acres
Pervious area (PA):	0.06	acres
Rainfall (P):	1.2	inches
% Impervious:	91.8%	
Rv = 0.05 + 0.009(I) =	0.876	

Post-Developed:

Total Site Area (A):	0.75	acres
Imperv. area (IA):	0.73	acres
Pervious area (PA):	0.02	acres
Rainfall (P):	1.2	inches
% Impervious:	97.3%	
Rv = 0.05 + 0.009(I) =	0.926	

Water Quality Volume Rv:

$$WQ-Rv = \text{Post-Rv} - \text{Pre-Rv} = 0.050$$

Water Quality Volume (WQv):

$$WQ_v = ((1.2 \text{ in.}) * R_v * A) / (12 \text{ in./ft.}) = 0.004 \text{ acre ft.} = \mathbf{163} \text{ cf}$$

Water Quality Peak Flow (Qwq) Calculations:

Water Quality Volume, in inches (WQ_{v,in}):

$$WQ_{v,in} = 1.2 * R_v = 0.060 \text{ inches}$$

Curve Number (CN): CN = 1000/[10+5P+10WQ_{v,in}-10(WQ_{v,in}²+1.25WQ_{v,in}P)^{1/2}] = 73.8

Time of Concentration (Tc): (Estimated) = 5.0 min. Tc = 0.08 hrs

Potential Maximum Soil Retention, in. (S): S = (1000/CN_w) - 10 = 3.54 in

Initial abstraction, in. (I_a): I_a = 0.2S (or refer to Table 2.1.5-3, pp. 2.1-29, GSWMM) = 0.708

I_a/P: I_a/P for Water Quality Storm = 0.590

Unit Discharge (q_u): (from GSWMM Figure 2.1.5-6, pp. 2.1-30) q_u = 550 csm/in

Water Quality Peak Flow (Qwq): Qwq = q_u * A (square miles) * WQ_{v,in} = 0.04 cfs

Bioretention Calculations

BMP # 16B

Per GDOT Drainage Manual Section 10.4.7

Area to BMP = 0.65 ac

Curve Number (CN):

Per: GASWMM pp.2.1-22, Table 2.1.5-1

Impv. CN = 98

Perv. CN = 61

Woods CN = 55

Impv. A = 0.62 ac

Perv. A = 0.03 ac

Woods A = 0.00 ac

Weighted CN = 96

Potential Maximum Soil Retention, in. (S):

$S = (1000/CN_w) - 10 = 0.39$ in

25-yr 24-hr. Rainfall (P_{25}):

Per GSWMM Table A-2 (Atlanta): $(0.27 \text{ in./hr.}) \times (24 \text{ hr.}) = 6.48$ in

25-yr. Runoff Volume (V_{25}):

$V_{25} = ((P_{25} - 0.2S)^2) / (P_{25} + 0.8S) = 6.04$ in

Time of Concentration (T_c):

$T_c = 0.08$ hrs

Initial abstraction, in. (I_a):

$I_a = 0.2S$ (or refer to Table 2.1.5-3, pp. 2.1-29, GSWMM) = 0.077

I_a/P :

I_a/P_{25} for 25-year storm = 0.012

Unit Discharge (q_u): (from GSWMM Figure 2.1.5-6, pp. 2.1-30)

q_u (25-year) = 1000 csm/in

Stormwater Flow Rate (Q):

$Q_{25} = q_u \times (A/640) \times V_{25} = 6.13$ cfs

Water Quality Volume (WQv) = 163 cf

Bioretention Basin Sizing:

Filter Media Depth (D_f) = 2 ft

Coefficient Of Permeability (k) = 3 ft/day (typically 2 to 4 ft/day)

Max. height of water above filter bed (H_{max}) = 0.75 ft

Avg. height of water above filter bed (H_f) = 0.38 ft (1/2 H_{max})

Design Filter Bed Drain Time (T_f) = 0.5 days (0.5 days recommended max)

Required Surface Area of Bioretention Basin:

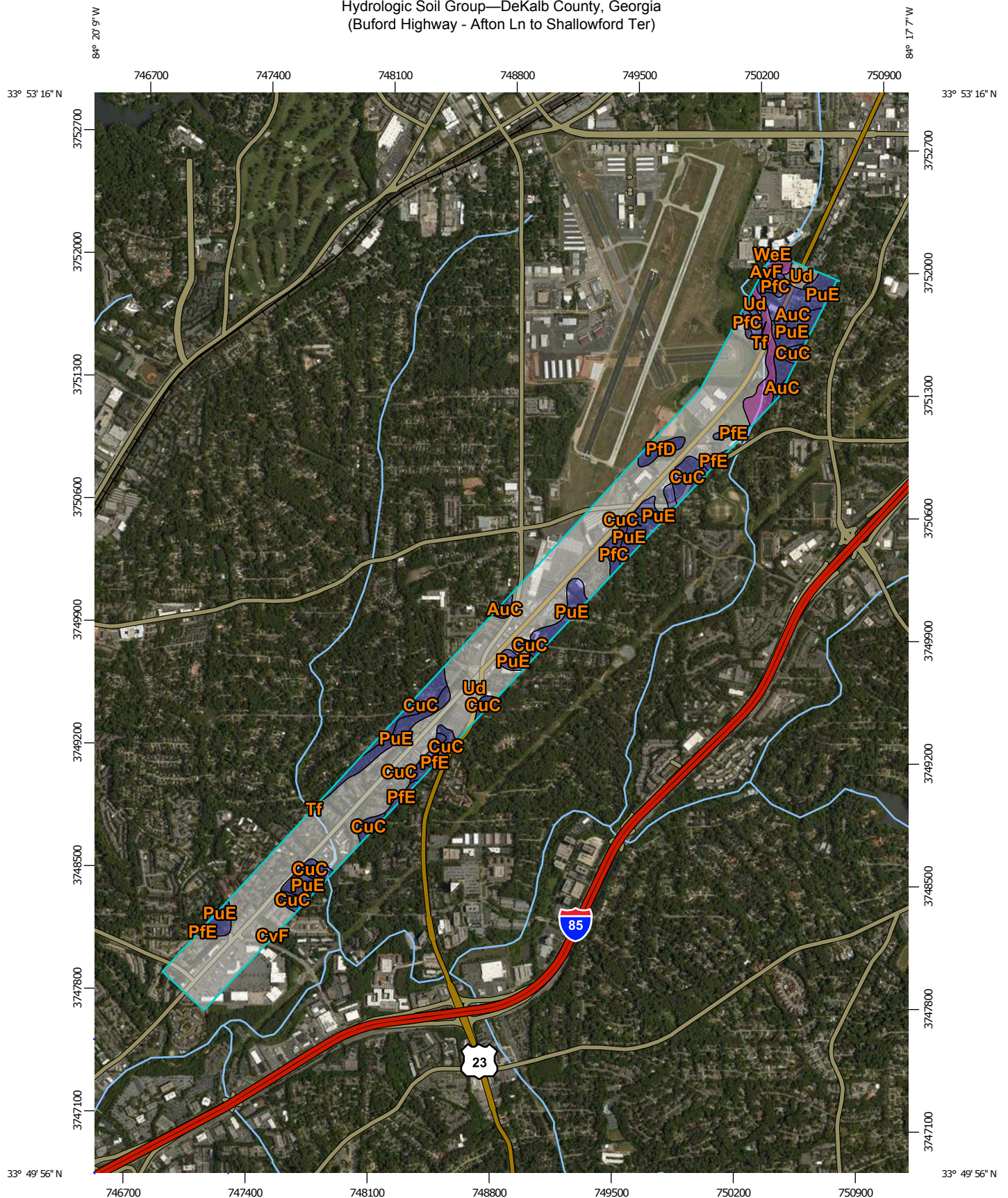
$Ab = [WQv \times D_f] / [k(H_f + D_f)(T_f)] = 92$ sf

Available Area = 113 sf

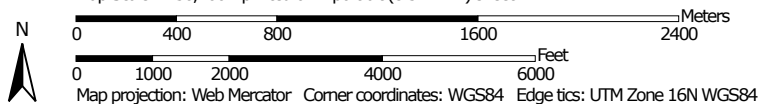
APPENDIX B

(SOIL DATA)

Hydrologic Soil Group—DeKalb County, Georgia (Buford Highway - Afton Ln to Shallowford Ter)



Map Scale: 1:30,100 if printed on A portrait (8.5" x 11") sheet.



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

9/25/2015
Page 1 of 4

MAP LEGEND

Area of Interest (AOI)









Area of Interest (AOI)

Soils

Soil Rating Polygons





-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Lines

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Points






-  A
-  A/D
-  B
-  B/D

-  C
-  C/D
-  D
-  Not rated or not available

Water Features

-  Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

-  Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: DeKalb County, Georgia
Survey Area Data: Version 7, Sep 19, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 4, 2014—Jun 18, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — DeKalb County, Georgia (GA089)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AkA	Altavista fine sandy loam, 0 to 2 percent slopes	C	0.5	0.1%
AuC	Appling-Urban land complex, 2 to 10 percent slopes	B	14.6	3.1%
AvF	Ashlar sandy loam, very rocky, 15 to 45 percent slopes	B	3.1	0.6%
CuC	Cecil-Urban land complex, 2 to 10 percent slopes	B	40.5	8.5%
CvF	Chestatee stony sandy loam, 15 to 45 percent slopes	B	0.2	0.0%
PfC	Pacolet sandy loam, 2 to 10 percent slopes	B	7.7	1.6%
PfD	Pacolet sandy loam, 10 to 15 percent slopes	B	7.5	1.6%
PfE	Pacolet sandy loam, 15 to 30 percent slopes	B	8.4	1.8%
PuE	Pacolet-Urban land complex, 10 to 25 percent slopes	B	60.2	12.6%
Tf	Toccoa sandy loam, 0 to 2 percent slopes, frequently flooded	A	16.1	3.4%
Ud	Urban land		318.9	66.7%
WeE	Wedowee sandy loam, 10 to 25 percent slopes	B	0.0	0.0%
Totals for Area of Interest			477.7	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

ATTACHMENT 11

PIOH Synopsis Summary of Major Issues Concept Team Meeting Minutes

DEPARTMENT OF TRANSPORTATION STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE P. I. No. 0004640 OFFICE Environmental/Location

DATE August 21, 2006

FROM: Harvey D. Keepler, State Environmental/Location Engineer

TO: Distribution Below

SUBJECT: PUBLIC INFORMATION OPEN HOUSE SYNOPSIS

PROJECT No. & COUNTY: MSL-0004-00(640) - DeKalb County

PROJECT DESCRIPTION: Pedestrian safety improvements to begin at the Fulton/DeKalb County line on Buford Highway and extend approximately 4.8 miles to Shallowford Terrace.

DATE: August 20, 2006

NUMBER IN ATTENDANCE: There was not an official attendance count taken due to the set-up of the PIOH in a public mall. There were 500 handout copies made and all were distributed. Eighteen comment cards were returned onsite.

FOR: 15

CONDITIONAL: 0

UNCOMMITTED: 3

AGAINST: 0

OFFICIALS IN ATTENDANCE: Kathy Gannon, DeKalb County Commissioner

ADDITIONAL COMMENTS: Local news media was in attendance.

PREPARED BY: Christen Vickery, PBS&J for Lisa Favors, GDOT OEL

TELEPHONE No.: (404) 699-6883 (Lisa Favors)

cc: Karlene Barron
Jonathan Cox
Mike Lobdell, P.E.
Zanda Montgomery
Bryant Poole, P.E.
Chris Woods

DEPARTMENT OF TRANSPORTATION STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE P. I. No. 0004640 OFFICE Environmental/Location

DATE September 1, 2006

FROM: Harvey D. Keepler, State Environmental/Location Engineer

TO: Distribution Below

SUBJECT: PUBLIC INFORMATION OPEN HOUSE SYNOPSIS

PROJECT No. & COUNTY: MSL-0004-00(640) - Dekalb County

PROJECT DESCRIPTION: Pedestrian safety improvements to begin at the Fulton/DeKalb County line on Buford Highway and extend approximately 4.8 miles to Shallowford Terrace.

DATE: August 31, 2006

NUMBER IN ATTENDANCE: 77

FOR: 52

CONDITIONAL: 4

UNCOMMITTED: 1

AGAINST: 5

OFFICIALS IN ATTENDANCE: None

ADDITIONAL COMMENTS: Local news media was in attendance.

PREPARED BY: Christen Vickery, PBS&J for Lisa Favors, GDOT OEL

TELEPHONE No.: (404) 699-6883 (Lisa Favors)

cc: Karlene Barron
Jonathan Cox
Mike Lobdell, P.E.
Zanda Montgomery
Bryant Poole, P.E.
Chris Woods

Combined:

Left turn problems/economic decline (median): 16

Concerns outside project area: 7

Law enforcement (jaywalking/speed): 5

Build Bridges for pedestrians: 5

Need Bike Lanes: 3

Landscaping: 3

Build more refuge islands: 3

Illegal Aliens will be helped at the cost of taxpayers: 2

Work with MARTA to adjust schedule: 1

Will create increased traffic: 1

OVERALL SUPPORT:

No. Opposed	No. In Support	Uncommitted	Conditional
7	77	19	9

Latin American:

Left turn problems/economic decline (median): 2

Concerns outside project area: 2

Need Bike Lanes: 2

Illegal Aliens will be helped at the cost of taxpayers: 2

Law enforcement (jaywalking/speed): 1

Build Bridges for pedestrians: 1

Work with MARTA to adjust schedule: 1

Will create increased traffic: 1

Landscaping: 0

Build more refuge islands: 0

Too many stop signs/signal timing: 0

OVERALL SUPPORT:

No. Opposed	No. In Support	Uncommitted	Conditional
1	19	4	2

Asian American:

Left turn problems/economic decline (median): 14

Concerns outside project area: 5

Law enforcement (jaywalking/speed): 4

Build Bridges for pedestrians: 4

Too many stop signs/signal timing: 4

Landscaping: 3

Build more refuge islands: 3

Need Bike Lanes: 1

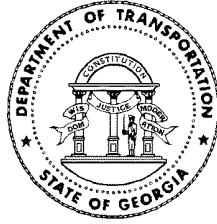
Will create increased traffic: 1

Illegal Aliens will be helped at the cost of taxpayers: 0

Work with MARTA to adjust schedule: 0

OVERALL SUPPORT:

No. Opposed	No. In Support	Uncommitted	Conditional
6	58	15	7



Concept Team Meeting Minutes

SR 13 from Afton Lane to Shallowford Terrace – Phase II
DeKalb County
P.I. No. 0009400

Date: December 8, 2015

Location/Time: 600 West Peachtree Street, Atlanta, GA 30080 – Room 403 / 10:00 a.m. - 11:45 a.m.

Attendees:

Xavier James	GDOT – OPD	Julia Billings	GDOT – Planning
Scott Lee	GDOT – D7 Precon	Tim Jacks	GDOT – Utilities
Shaveka McCarty	GDOT – D7 TO	Katelyn DiGioia	GDOT – OTO
Patrice Ruffin	City of Brookhaven	Ryan Perry	GDOT – OES
Richard Meehan	City of Brookhaven	Wendy Dyson	Atkins
Derrick Cameron	GDOT – Eng Svcs	Kaitlin Potnick	Atkins
Patrick Bradshaw	ARC – Transportation	Kathy McCabe	Atkins
Raymond Chandler	GDOT – Util SUE	Nikki Reutlinger	Atkins
Stevonn Dilligard	GDOT – Util SUE	Helen Keller	Atkins
Reginald Anderson	City of Chamblee		

Minutes By: Helen Keller

The following items were discussed at the meeting:

- Xavier James, the GDOT Project Manager, welcomed the attendees and started the meeting with introductions and an overview of the project.
- Mr. James then turned the meeting over to Nikki Reutlinger with Atkins, the consultant project manager.
- Ms. Reutlinger went through a brief history of the project and began the review of the draft concept report.
- *General Comments on the Draft Concept Report:*
 - Atkins to add north arrow to the project location map

- The age of the crash data was brought up and it was suggested that more current crash data be used in the Project Justification Statement. GDOT Traffic Ops will look into this and provide Atkins with updated data as necessary.
- As this project is Phase II of a larger project it was suggested that a paragraph be added to the Project Justification Statement (PJS) providing background information, including Phase I (Buford Hwy from Lenox Rd to Afton Ln).
- A comment was made regarding the percentages quoted in the PJS about reduction of pedestrian crashes, suggesting it might be better to revise the wording. The PJS was provided by GDOT Traffic Ops. They will look into the matter and provide an updated statement if necessary.
- It was noted that there were 5 TE studies done for the pedestrian hybrid beacons. The first location ended up being incorporated into Phase I during construction. Of the four remaining locations 3 met warrants and are included in the concept layout. The one location that did not meet warrants is near the intersection of Buford Hwy with Drew Valley Rd. Ms. Reutlinger noted that the TE studies still need to be approved by GDOT.
- A comment was made regarding the use of Type 7 curb face on the median. Would it be better to use Type 2 header curb to keep vehicles from popping up on the median, potentially striking pedestrians? Ms. Dyson informed the team that in early meetings for Phase I of this project Type 7 curb face was agreed upon to allow for emergency vehicle access across the medians, as concerns had been voiced about that issue. Given that information the team agreed to keep the typical section as is, using Type 7 curb face for the median.
- Suggestion to change the value shown for the standard median width from 4' minimum to what the typical width is. Atkins will make this change.
- Ms. Reutlinger brought up discussion about lighting on the project. In addition to the pedestrian lighting GDOT had requested that the upgrade of existing street lighting to LED lights be investigated for inclusion within the project. Based on conversations had and information received, Atkins believes that all existing street lighting is on existing Georgia Power poles. Based on previous experiences, Georgia Power would need to approve of any changes affecting their poles and so it was thought that Georgia Power may want to look at this design rather than having a consultant. Mr. Meehan relayed that he had heard that Georgia Power is planning to upgrade all cobras (at least within the City of Brookhaven) from HPS to LED over the next 12 – 18 months. Given all of this information the concept team decided that Atkins should move forward with just the pedestrian lighting.
- Suggestion to add the locations where design exceptions are needed for sub-standard vertical curve K values and Stopping Sight Distance. Atkins will add this information.
- Richard Meehan from the City of Brookhaven requested to add Google Fiber to the list of utilities. Atkins will add this information.
- Need to make sure that utilities are covered by any easements taken for the project. Atkins will include Utility easements as part of the anticipated easements.

- It was noted that this project was covered by the CE for Phase I, so only a Re-evaluation will required for Phase II.
- Discussion concerning safety issues during construction was brought up, specifically with regards to the median: vehicles making u-turns and pedestrian safety. Notes will be added to the staging plans.
- Atkins to add concept team meeting date.
- Atkins to update the project cost estimate summary with final PE costs, the right-of-way estimate, and an updated utility cost estimate.
- Mr. James guided the concept team through the CRAFT (Comprehensive Risk Assessment for Transportation) Tool.

Action Items:

- GDOT Planning to get TIP number to be included in the air study
- GDOT Utilities to provide updated cost estimate
- GDOT OTO to provide updated collision data & project justification data
- GDOT to check on status of TE Reports
- Atkins to revise Concept Report and appropriate attachments as per comments above

Attachments: Concept Team Meeting Sign-in sheet

SIGN IN SHEET – December 8, 2015

PROJECT: PI 0009400 DeKalb County, SR 13 From Afton Ln to Shallowford Terrace - Phase II (Concept Team Meeting)

NAME	ORGANIZATION/Title	EMAIL ADDRESS	PHONE NO.
Xavier James	GDOT – OPD	xjames@dot.ga.gov	(404) 631-1583
Nikki Reutlinger	Atkins	nicole.reutlinger@atkinsglobal.com	(770) 933-0280
Kathy McCabe	Atkins	kathy.mccabe@atkinsglobal.com	(770) 933-0280
HELEN KELLER	ATKINS	helen.keller@atkinsglobal.com	(770) 933-0280
Kaitlin Potnick	Atkins	kaitlin.potnick@atkinsglobal.com	(770) 933-0280
SCOTT LEE	GDOT-D7 PRECON.	SLEE@DOT.GA.GOV	(770) 986-1261
Shaveta McCarty	GDOT-D7 Traffic Ops	SMCCARTY@DOT.GA.GOV	(770) 986-1779
PATRICE RUFFIN	BROOKHAVEN	PATRICE.RUFFIN@BROOKHAVENGA.GOV	(404) 637-0500
Wendy Dyson	Atkins	wendy.dyson@atkinsglobal.com	(770) 933-0280
Richard Meehan	Brookhaven	Richard.Meehan@Brookhaviga.gov	(404) 637-0520
DERRICK CAMERON	Regional Engineering Services	DCAMERON@DOT.GA.GOV	(404) 631-1223
Patrick Bradshaw	ARC-Transportation	pbradshaw@atlantaregional.com	(404) 463-3273
Raymond Chandler	GDOT-UTILITIES SUE	rchandler@dot.ga.gov	(404) 633-1360
Stevann Dilligard	GDOT-Utilities -SUE	sdilligard@dot.ga.gov	(404) 631 1358
REGINALD ANDERSON	CITY OF CHAMBLEE	randerson@chambleega.gov	(770) 395-2362
Julia Billings	GDOT Planning	jbillings@dot.ga.gov	(404) 631-1779
TIM JACKS	GDOT-UTILITIES G.O.	TJacks@dot.ga.gov	(404) 631-1821
Katelyn Digioia	GDOT - OTO	kdigioia@dot.ga.gov	(404) 635 2839
Ryan Perry	GDOT - DES	VPerry @ " "	() 471